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## INTER-COUNTRY INEQUALITY IN SOCIAL INDICATORS OF DEVELOPMENT

**ABSTRACT.** In 1955 Kuznets developed a hypothesis about the relationship between the degree of personal income inequality within a country and the level of economic development of the country. This hypothesis suggests that with economic growth, interpersonal income inequality first increases but after a certain point starts to decline. This is known as the inverted-U hypothesis. In 1965, Williamson applied this inverted-U hypothesis to the widely observed pattern of intra-country regional inequality with economic development. This hypothesis was later extended to inter-country inequality in Per Capita Gross National Product (PCGNP) by Ram (1989). The paradigm of development economics has recently been shifted from PCGNP to human well-being and it has been broadly accepted that economic growth does not automatically translate into human well-being. The present study is an attempt to extend the application of the inverted-U hypothesis to explain the relationship between inter-country inequality in social indicators of development and economic growth.

### 1. INTRODUCTION AND REVIEW OF LITERATURE

Kuznets (1995) developed an important hypothesis about the relationship between degree of income inequality within a country and its level of economic development. This hypothesis suggests that with economic growth, inter-personal income inequality first increases but after a certain turning point starts to decline. This hypothesis is known as the (inverted) U-hypothesis. This proposition has received considerable attention due to two major reasons: its predictive capacity relative to income inequality over the course of economic growth; and the implication of a possible trade-off between economic growth and income inequality at early stages of development.

Williamson (1965) applied this inverted-U hypothesis to the widely observed pattern of intra-country regional inequality with



*Social Indicators Research* **49**: 335–345, 2000.

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economic development. The rationale behind regional inequality inverted-U hypothesis is almost analogous to that of personal inequality inverted-U. The reason behind the nature of the relationship between intra-country regional inequality and economic growth being an inverted-U shape, is due to the existence of a concentration of wealth and income generating resources in the early stages of development, followed by a more widespread dispersion in the later stages. The only difference between regional inequality and personal inequality is that with regional inequality the concentration and dispersion occurs among regions of a country, while in case of personal inequality concentration and dispersion occurs among persons living in a country. Four main reasons behind the existence of inverted-U regional inequality as brought forth by Williamson are: differences in natural resources endowment, labour migration, capital movement and government policies.

Ram (1989) extended Kuznets' inverted-U hypothesis to inter-country inequality in per capita gross national product (PCGNP). Ram is of the opinion that with the growth of the World economy, inter-country income inequality at first increases and after some 'turning point' declines (i.e. Inter-country inequality in PCGNP follows an inverted-U shape.) The reasons cited by Ram in support of this extension are:

- (1) According to Ram the World economy can be divided into a traditional and a modern sector with very different technologies, product composition, input productivities, input prices and income levels.
- (2) In large parts of the traditional sector there exists a relative abundance of labour, something which the modern sector lacks.
- (3) Despite the barriers to international migration there is substantial movement of labour from the traditional to the modern sector.
- (4) There is a flow of trade between the developed countries and the less developed countries. Consequently, as the World economy develops, technology and factor prices in the traditional sector tend to change the structure of the exchange between the traditional and the modern sector undergoes a corresponding variation.

- (5) Moreover, as the World economy continues to develop, more and more countries are expected to join the developed country group (i.e. the modern sector). Consequently, the relative size of the traditional sector is likely to decline while that of the modern sector is likely to increase with the passage of time and expansion of the World economy.

Besides this type of dualistic growth framework argument as advocated by Kuznets, Ram offers another argument in favour of inter-country inequality being of inverted-U shape. According to him, the independent nations at various levels of economic development interact through trade and transfer at different spheres. In general, the poorest countries have the largest potential for development but lack the resources needed for exploiting it. With increased interaction between countries, the situation will gradually change. More specifically, at the initial stage of development, those at the bottom grow slowly due to the limited capacity to exploit the large potential they have; the high income countries may grow at a modest rate due to the limited potential they have and a few middle income countries might grow rapidly. Therefore, at the early stage of development of the World economy, the inter-country inequality tends to increase. But as the poorer countries' capacity to utilise their potential increases, their growth rates increase. Consequently, after a 'turning point' the inter-country inequality in the world system declines.

## 2. HYPOTHESIS

Review of literature in the earlier section depicts that inter-country inequality in per capita gross national product follows an inverted U-shape. Recently the paradigm of development economics has shifted from per capita gross national product to human well-being. And it has also been broadly accepted that economic growth does not automatically translate into human well-being. In this context, it is relevant to see the nature of inter-country inequality in social indicators of development or to test the possibility of extending Kuznets' inverted U hypothesis to the social indicators of development.

The present study postulates that the inter-country inequality in terms of most of the social indicators of development is expected

to decrease initially and after a turning point start to increase. That is, in Kuznets' terminology the inter-country inequality in terms of most of the social indicators of life adopts a U-shape. The study also advocates that the inter-country inequality in social indicators of development follows the same pattern as Third World countries. Therefore, *the study attempts to test the hypothesis that Kuznets' inverted U-hypothesis does not hold in the case of the social indicators of development, with a few exceptions.*

### 3. WHY DO WE EXPECT U-SHAPED CURVES FOR THE SOCIAL INDICATORS OF DEVELOPMENT?

In order to test the proposed hypothesis, the present study uses a few important social indicators of development in the spheres of health, nutrition, education and female participation in the economy. Life expectancy of birth (LIFE), infant survival rate (ISR) represent health and nutrition achievements of a country; enrollment at the primary level of education (ENRP) is an indicator of education. (Adult literacy rate is the most frequently used indicator for education, but for a large number of countries, no time series data is available. Hence it is not possible to obtain inter-country inequality figures over a period.) Female labour force (FLAB) has been taken as an indicator of female participation in the economy. (But the figure available for female labour force in the economy may be a distorted one, when a high percentage of the total labour force is engaged in farming, as no country has an accurate measure or the woman's role in agriculture. One to non-availability of time-series data for any other better indicator of female participation in the economy the study incorporates FLAB.) In the next few paragraphs, we attempt to explain why we expect the inter-country inequality pattern of the above-mentioned social indicators of development to follow a U-shape in most cases rather than an inverted-U shape.

Improvement in health indicators or increase in LIFE and ISR of a country depends on advance in medical science as well as on improvement in environmental conditions, e.g. increased access to clean water and improved sanitation. It is difficult to distinguish between the impact of these factors on the improvement in the health indicators of a country. But one might believe that economic

growth will improve a country's environmental conditions, and that these improvements will seem to be continuous as the real income of the country increases. On the other hand, advances in medical science require expensive research. Such medical research into preventive and curative measures in general take place in developed countries. Therefore, the developed countries enjoy the fruit of research first. But as soon as a measure or medicine for improvement in health, prevention or cure of a disease has been developed it can be imported by other countries. So health breakthroughs in any country will spread rapidly to all others where the means for implementation exist. Therefore, although low income countries are not usually able to take part in medical research, they can enjoy the benefits by importing medical techniques and personnel. Such techniques spread very rapidly. Moreover, the public health programmes of insect control, environmental sanitation, health, education, maternal and child health services of these countries change the picture of life expectancy and infant mortality. In fact, increase in life expectancy at birth and reduction of infant mortality rate in less developed countries do not depend on the country's own income, while those of more developed countries largely depend on their own income. Hence, improvement in these spheres of life is very rapid compared to improvement in income in the low income countries. But this process cannot continue for long. After some time the improvements in medical research etc. become so specialized that importation, adoption and implementation of medical techniques in the relatively less developed countries is difficult due to lack of suitable personnel, equipment and the high cost. Therefore, at a certain point the gap between various countries widens with regard to LIFE and ISR.

But the case of educational indicators is the reverse. Initially, there were very few countries with a high level of enrollment, while a large number have a very low level of enrollment. The gap increases as the developed countries which already have very high level of educational attainment increase the enrollment ratio rapidly. With the increasing global consciousness concerning literacy, the enrollment ratio at the primary level of education has increased together with an increase in adult literacy. This tends to reduce

the gap between enrollment ratio at the primary level in developed countries and less developed countries.

Industrialisation and the emergence of market economies in low income countries reduces the female labour force. Traditional work opportunities for women on farms and in home business are lost as labour becomes a market commodity; moreover, because of family obligations, competition with males, and sexual discrimination, women have difficulty finding employment in the industrial sector of the economy. In advanced industrial nations, however, there is a positive rather than a negative relationship between development and female labour force. Continued economic growth and expansion of the tertiary sector of industrialized economies, where female labelled jobs are concentrated, increased the demand for female workers. With the increased supply of middle-aged women freed from child bearing duties, this higher demand brought about by post-industrial growth increases the female labour force. The result is a U-shaped relationship in which the female labour force declines with the emergence of industrial employment, remains low with industrial expansion, but increased with growth of the tertiary sector in advanced industrial economies.

Similarly, with different economies at different levels of development, the female labour force decreases with expansion of industrialization, i.e. as more and more countries join the industrialized group, and after a certain juncture, the female labour force increases as more and more countries become service dominated. Hence as the World economy expands, inequality in female labour force participation rate decreases and after a turning point increases.

It has been observed from the few paragraphs above, that with the expansion of the World economy, the inter-country inequality in the indicators of health and nutrition (LIFE and ISR) and female participation in the economy (FLAB) follow U-shape trends while that in the indicator in education (ENRP) portrays an inverted-U shape.

#### 4. METHODOLOGY

Standard regression analysis is used to test the pattern of relationship between inter-country inequality in the social indicators of

development and the expansion of the World economy. The period considered here is 1970 to 1990. The World Table (1992) published by the World Bank is the source of data for all the variables incorporated in the study. The analysis proceeds in two parts: one for the entire World and the other for the developing countries.

For each indicator the study estimates two sets of relationships:

- (i) between the indicator and the average world income (or average income of the developing countries).
- (ii) between the indicator and time.

In each case two equations are estimated:

$$(1) \quad Ineq = \alpha + \beta_1 Y$$

$$(2) \quad Ineq = \gamma + \delta_1 Y + \delta_2 Y^2$$

where *Ineq* = the inter-country inequality of the indicator; *Y* = average level of economic development measured by the world mean income.

Alternatively, time is used to represent the level of progress. In that case equations (1) and (2) are replaced by the following equations:

$$(3) \quad Ineq = \alpha^* + \beta_1^* t$$

$$(4) \quad Ineq = \gamma^* + \delta_1^* t + \delta_2^* t^2$$

As has been mentioned in section II, the hypothesis of the study is that the inter-country inequality in social indicators of development decreased following a U-shape with the expansion of the world economy, while that of PCGNP increases following a inverted-U pattern. This can be tested by the relationships presented in (1) and (2) and (3) and (4). In equation (1) and (3) inter-country inequality is declining, stabilizing or increasing depending on

$$\beta_1 < 0, = 0, > 0$$

$$\beta_1^* < 0, = 0, > 0$$

Estimation of equations (2) and (4) provide direct support for the hypothesis of increasing inter-country inequality by indicating a U-shaped pattern if  $\delta_1 < 0$  and  $\delta_2 > 0$  or  $\delta_1^* < 0$  and  $\delta_2^* > 0$ .



TABLE I  
Regression results: World

| Indicators | Equations    | Intercept | Coefficients      |                   | R <sup>2</sup> | F-ratio        |
|------------|--------------|-----------|-------------------|-------------------|----------------|----------------|
| LIFE       | Income:      |           |                   |                   |                |                |
|            | Equation (1) | 0.2087    | -0.0001* (-14.71) |                   | 0.92           | 216.33 (1,19)  |
|            | Equation (2) | 0.2164    | -0.00002* (-5.80) | 0.0000 (0.69)     | 0.94           | 139.69 (2,18)  |
|            | Time:        |           |                   |                   |                |                |
|            | Equation (1) | 0.2035    | -0.0018* (-39.85) |                   | 0.99           | 1587.88 (1,19) |
|            | Equation (2) | 0.2052    | -0.0023           | 0.00002           | 0.99           | 1056.17        |
| IMR        | Income:      |           |                   |                   |                |                |
|            | Equation (1) | 0.3337    | 0.0002* (12.44)   |                   | 0.89           | 154.68 (1,19)  |
|            | Equation (2) | 0.3182    | 0.0003** (2.07)   | -0.0000 (-0.45)   | 0.89           | 74.21 (2,18)   |
|            | Time:        |           |                   |                   |                |                |
|            | Equation (1) | 0.3770    | 0.0097* (32.64)   |                   | 0.98           | 1065.36 (1,19) |
|            | Equation (2) | 0.3594    | 0.0143* (22.27)   | -0.0002* (-7.34)  | 0.99           | 2044.10 (2,18) |
| ENRP       | Income:      |           |                   |                   |                |                |
|            | Equation (1) | 0.0000    | 0.0000 (-3.57)    |                   |                | 00.00 (1, 15)  |
|            | Equation (2) | 0.3902    | 0.0001 (0.13)     | -0.0000 (-0.68)   | 0.48           | 6.39 (2,14)    |
|            | Time:        |           |                   |                   |                |                |
|            | Equation (1) | 0.4227    | 0.0089* (-5.37)   |                   | 0.66           | 28.80 (1,15)   |
|            | Equation (2) | 0.3821    | -0.0003 (-0.05)   | -0.0004** (-1.35) | 0.70           | 16.11 (2,14)   |
| FLAB       | Income:      |           |                   |                   |                |                |
|            | Equation(1)  | 0.5162    | -0.0001* (-10.94) |                   | 0.86           | 119.65 (1,19)  |
|            | Equation(2)  | 0.5401    | -0.0002** (-2.52) | 0.0000 (1.07)     | 0.87           | 60.86 (2,18)   |
|            | Time:        |           |                   |                   |                |                |
|            | Equation (1) | 0.4903    | -0.0057* (-17.08) |                   | 0.94           | 291.71 (1,19)  |
|            | Equation (2) | 0.5070    | -0.0101* (-10.35) | 0.0002* (4.62)    | 0.97           | 312.93 (2,18)  |
| PCGNP      | Income:      |           |                   |                   |                |                |
|            | Equation (1) | 1.0028    | 0.0009* (2.54)    |                   | 0.25           | 6.47 (1,19)    |
|            | Equation (2) | -1.0168   | 0.0100* (5.14)    | -0.0000 (-4.69)   | 0.66           | 17.79 (2,18)   |
|            | Time:        |           |                   |                   |                |                |
|            | Equation (1) | 1.3872    | 0.0174** (1.11)   |                   | 0.06           | 1.23 (1,19)    |
|            | Equation (2) | 0.4517    | 0.2614* (8.08)    | -0.0111* (-7.76)  | 0.78           | 32.66 (1,19)   |

Note: Countries taken into account 110

Figures in parentheses are t-ratios and degrees respectively.

\* Indicates significance at 5% level. \*\* Indicates significance at 10% level.

## 5. RESULTS

The regression results presented in Table I and Table II offer insights into the relationship between inter-country inequality and the level of development of the entire World and the developing World, respectively. The slope terms of LIFE, FLAB and ENRP indicate declining trends for the World and developing countries. The intercept and the slope terms for these indicators of the World economy and the developing economics portray almost identical pictures. The



TABLE II  
Regression results: Developing countries

| Indicators | Equations    | Intercept | Coefficients    |          | $\bar{R}^2$      | F-ratio             |
|------------|--------------|-----------|-----------------|----------|------------------|---------------------|
| LIFE       | Income:      |           |                 |          |                  |                     |
|            | Equation (1) | 0.1994    | -0.0000*        | (-7.77)  | 0.76             | 60.36 (1,19)        |
|            | Equation (2) | -0.0001   | -0.0003**       | (-2.09)  | 0.0000 (1.22)    | 0.79 33.29 (2,18)   |
|            | Time:        |           |                 |          |                  |                     |
|            | Equation (1) | 0.1920    | -0.0017*        | (-10.49) | 0.85             | 110.10 (1,19)       |
|            | Equation (2) | 0.1981    | -0.0033**       | (-1.78)  | 0.00007 (0.88)   | 0.90 78.05 (2,18)   |
| IMR        | Income:      |           |                 |          |                  |                     |
|            | Equation (1) | 0.3337    | 0.0002*         | (12.44)  | 0.89             | 154.68 (1,19)       |
|            | Equation (2) | 0.3182    | 0.0003**        | (2.07)   | -0.0000 (-0.45)  | 0.89 74.21 (2,18)   |
|            | Time:        |           |                 |          |                  |                     |
|            | Equation (1) | -0.3770   | 0.0097*         | (32.64)  | 0.98             | 1065.36 (1,19)      |
|            | Equation (2) | 0.3594    | 0.0143*         | (22.27)  | -0.0002 (-7.34)  | 0.99 2044.10 (2,18) |
| ENRP       | Income:      |           |                 |          |                  |                     |
|            | Equation (1) | 0.4614    | -0.0002*        | (-3.57)  | 0.46             | 12.76 (1,15)        |
|            | Equation (2) | 0.3902    | 0.0001 (0.13)   |          | -0.0000 (-0.68)  | 0.48 6.39 (2,14)    |
|            | Time:        |           |                 |          |                  |                     |
|            | Equation (1) | 0.4227    | -0.0089*        | (-5.37)  | 0.66             | 28.80 (1,15)        |
|            | Equation (2) | 0.3821    | -0.0003 (-0.05) |          | -0.0004 (-1.35)  | 0.70 16.11 (2,14)   |
| FLAB       | Income:      |           |                 |          |                  |                     |
|            | Equation (1) | 0.5162    | -0.0001*        | (-10.94) | 0.86             | 119.65 (1,19)       |
|            | Equation (2) | 0.5401    | -0.0002**       | (-2.52)  | 0.0000 (1.07)    | 0.87 60.86 (2,18)   |
|            | Time:        |           |                 |          |                  |                     |
|            | Equation (1) | 0.4903    | -0.0057*        | (-11.08) | 0.94             | 291.71 (1,19)       |
|            | Equation (2) | 0.5070    | -0.0101*        | (-10.35) | 0.0002* (4.62)   | 0.97 312.93 (2,18)  |
| PCGNP      | Income:      |           |                 |          |                  |                     |
|            | Equation (1) | 1.0028    | 0.0009**        | (2.54)   | 0.25             | 6.47 (1,19)         |
|            | Equation (2) | -1.0168   | 0.0100*         | (5.14)   | -0.0000* (-4.69) | 0.66 17.79 (2,18)   |
|            | Time:        |           |                 |          |                  |                     |
|            | Equation (1) | 1.3872    | 0.0174 (1.11)   |          | 0.06             | 1.23 (1,19)         |
|            | Equation (2) | 0.4517    | 0.2614* (8.08)  |          | -0.0111* (-7.76) | 0.78 32.66 (1,18)   |

Note: Countries taken into account 110

Figures in parentheses are t-ratios and degrees of freedom respectively.

\* Indicates significance at 5% level.

\*\* Indicates significance at 10% level.

slope terms for IMR for the World and the developing countries are both positive, implying a negative slope for ISR.

The first set of equations using PCGNP as the explanatory variable offer weak support for the hypothesis, while the second set using time as the determinant variable provides strong support for the hypothesis.

Although the hypothesis proposed in this study seems to be reasonable and the study provides empirical support in favour of the hypothesis, it is worth noting a few caveats in it:

- (1) This type of result is very much dependent on the sample. In this study it is not possible to take the entire World as a sample. Hence a change of sample may alter the conclusion drawn.
- (2) The sample consists of 21 Years only: 1970 to 1990. It would be made on a longer series. But comparable data were not available.

## 6. CONCLUDING REMARKS

The paradigm of development economics has shifted from gross national product to human well-being. Many human choices extend far beyond economic well-being. Knowledge, health, a clean physical environment, and simple pleasures of life are not exclusively, or largely, dependent on income. National wealth can expend peoples' choice in these areas. But it might not. The use that people make of their wealth, not the wealth itself, is decisive. And unless societies recognize that their real wealth is their people, an excessive obsession with creating material wealth can obscure the goal of enriching human lives. It has been broadly accepted that economic growth does not automatically translate into a better quality of life. Therefore, most national and international bodies are emphasizing improvement in social indicators of development that are directly related to human well-being. In this context, it is worthy while extending Kuznets' hypothesis to inter-country inequality in indicators relating to human development i.e. to test whether human development among countries declines, increases or stabilizes over time.

## NOTES

(A) Data sources:

1. World Bank: World Tables (Different editions).
2. World Bank: World Development Reports (Different editions).
3. UNDP: Human Development Reports (Different editions).

(B) From the official data sources we obtained Figure for Infant mortality rate per 1000 (IMR) of live births. It was possible to obtain infant survival rate per 1000 of live births (ISR) simply by subtracting IMR from 1000, i.e.  $ISR = 1000 - IMR$ . We estimated the patterns of inequality for IMR. The patterns should be reversed for ISR.

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