P-ISSN: 2709-6254 | Journal of Development and Social Sciences | April-June 2022,Vol. 3, No. 2
O-ISSN:2709-6262 | http://dx.doi.org/10.47205/jdss.2022(3-II)10 | [96-104]

JDSS Journal of Development and Social Sciences
www.jdss.org.pk

**RESEARCH PAPER**

# Analysis of Human Development, Economic Growth and Income Inequality in SAARC Country

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**PAPER INFO**

**Received:**
February 15, 2022
**Accepted:**
April 10, 2022
**Online:**
April 15 21, 2022
**Keywords:**
Economic-Growth, Income-inequality, Poverty and HD

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**ABSTRACT**

The Human Development, Income Inequality and Economic Growth are inter-related and this paper highlights the role of Human Development in the development of SAARC's member states. The paper uses comprehensive measures of Human Development and traces out its impact on Economic Growth using panel data model, estimated by Panel Least Square method. The Hausman Test has been used to decide between the selection of Fixed Effects and Random Effect Model. The period of analysis is from 2000 to 2016. The empirical results show that education affects HDI (Human Development Index) significantly. Moreover, when control of corruption variable is excluded from the equations, the results have been unchanged. On the other hand, Income Inequality and Human Development Index (HDI) are negatively correlated. It means that higher income inequality leads to lower HDI. The impact of HDI on Gini coefficient is positive and significant. It means that HDI increase income inequality. However, health variable do not establish statistically valid relationship with Gini coefficient. The relationship between HDI and growth is negative as the impact of one year lag HDI in GDP growth is negative and statistically significant.

## Introduction

In general consensus, in the literature of economic development, economic growth is very important to eliminate the absolute poverty level which results in the reduction of income inequality. In this respect, the very influential hypothesis which has received very close attention in the income distribution and economic development literature, is the Kuznet's curve, proposed by Kuznets (1955). He proposed that in the initial stage of economic growth, the income inequality worsens but after a certain period in the process of economic development income inequality will improve. Hence the relationship between economic growth and income inequality can be represented by an inverted "U" pattern referred to as the Kuznets inverted 'U' hypothesis.

Apart from Kuznets' inverted "U" hypothesis**,** drivers of economic growth rate are also widely discussed. There are many factors which can accelerate economic growth, however, Schultz (1961) observed that investment in human capital formation is the major driver of the growth rate of output. Similarly this phenomena is also considered by Uzawa (1965) and Rozen (1976) that human capital is the main source of accelerating economic growth of a country. Moreover, they further states that human development increases economic growth as human beings adopt and implement new technologies from abroad which improves productivity per unit of human capital in relation to physical capital.

Becker (1975) stated that human capital is embodied knowledge and skills. The economic growth is only based on advance technical and scientific kills. Moreover he further noted that education and training are the main sources of human capital.

Wagner (1999) suggests some features of the German Skill Creation, which contribute high value and widespread acceptance in the labor market. It provides active and positive role of employer unions or associations. It also useful as it share costs among the labour and employer.

Many German companies provide apprenticeship to labour with practical training. In this respect some part time vocational school for the training labour also established, and provides training facility in the field of crafting, industry and trade, marketing, price mechanism and technical training (PIDE, 2001). Finally the 'drive to maturity', requires the administrative and political skills, and this also emphasized by the World Bank that "Good Governance" literature focused on the new institutional economics bodies to speak out the micro and macro level reforms for a sustainable market economy (Wilson, 1989).

Ravallion (2011) reported that income inequality has been sharply increased in China, however due to structure reforms china achieved sustained economic development even in the same situation compared with Brazil, they have reduced income inequality coupled with moderate rate of economic growth. It has been observed in the paper of Smeeding (2005) that in the recent years most advanced countries like USA having high income inequality than other Organization for Economic Co-operation and Development (OECD, 2011; Muzaffar, et. al. 2017).

Son, H (2007) in his study found that rapid economic growth has been recorded in South & East Asia's which resulted reduction in the poverty level. Moreover rapid economic growth has normally bypassed the poor people as during the rapid economic growth mostly people has no capital to invest there and the capitalist has the powerful opportunity to invest and to gain profit easily while economic growth determines that how effective growth be converted into reduction in poverty and income inequality.

There are contrasting views between the economic growth and income inequality. Psacharopoulos et al. (1995) conducted research involving Latin American Countries, reveals that economic growth is negatively related to income inequality. Other studies such as Ravallion (1997) found that amongst the developing countries there is no evidence while increasing in aggregate income which infact leads to a significant reduction in income inequality. Other authors i.e. Deininger and Squire (1998) and Schultz (1998) gone through the relationship of economic growth and income inequality but they found no significant relationship.

According to new theories, Research and Development (R&D) improves technical progress as the same incorporate new technical idea and innovation in the field and bring simplicity in the work. According to Lucas (1988), the higher level of education of the workers' bring higher productivity of capital because higher educated workforce has more and latest innovative ideas and the same is very fruitful for higher productivity. In other models, it has been suggested that higher growth has been linked with higher level of education. When individual worker observe the higher career growth in an organization, then they automatically attract to get higher level of education and innovation which further developed organization. It raises productivity as well as average level of education of the workforce.

Galor and Moav (1999) discussed that in presence of credit constraints, inequality has negative effect on human capital while a positive effect on capital accumulation. He further argues that in early stage of development the people has no source of sufficient physical capital meaning thereby that the physical capital was so scarce and in return to human capital was also lower than the return on physical capital and process for further development is only based on capital formation and in that era development is only linked

with only capital formation. But in the recent studies suggests that without human development no one can increase capital productivity.

The present study is aimed to analyze the relationship among human development, economic growth and income inequality in the South Asian Association of the Regional countries (SAARC). The present study contributes to the body of knowledge in the following ways: first, it is first of its kind in the SAARC countries with a panel data of eight countries. The panel is by and large a homogeneous panel as SAARC members enjoy similar socio-economic and institutional characteristics. Secondly, if there is any papers, it uses either single equation or uses less number of countries/variables. Thirdly, it uses a comparatively large panel data with observation for eight countries from 2000 to 2016. Econometric models are derived from the literature and estimated using panel least square method.

**Econometric Model**

The dynamics of Human Development (HD), Income Inequality and Economic Growth will be analyzed by the equations from equation (1) to equation (3). The model for determinants of human development measured by Human Development Index (HDI) is derived from (Binder & Georgiadis, 2010). They estimated determinants of HDI for 84 countries from 1970-2005. The adopted version of the equation is given below in equation (1).

Where, $HD_{c,t}$ is the index of human development for country *'c'* at time '*t*' and $Gini_{c,t}$ is the measure of income inequality i.e. Gini coefficient for country *'c'* at time '*t*'. GDP_R is the one year lag of the real GDP of country *'c'* at time '*t*'. $X_{c,t}$ the set of those control variables which can affect human development are also included in the equation (1) $\eta_c$ is the country specific effect which is not included in the equation, and $\gamma_t$ is the time effect. $\varepsilon_{c,t}$ is the random error.

Blinder & Georgiadis (2010) model of determinant is auto-distributed lag model which is estimated for 84 countries which is a single equation approach. The present study is also based on the single equation method with new variables in the model. They used different sets of variable such as institutional development index, gender inequality and religious environment. The institutional development index is based on the data of corruption, law and order, quality of bureaucracy, investment profile etc.

Equation (2) is constructed from Roine et. al (2009). They used a panel of 16 countries over the entire twentieth century. This method is applied to equation (3) to identify determinants of inequality in eight SAARC countries. They used growth, financial development, government spending and taxes as determinants of inequality. but we have incorporated inflation and health variables.

Whereas, equation (3) is the alternate version of Blinder and Georgiadis (2010). These models are estimated using appropriate econometric technique.

$$HD_{c,t} = \alpha_0 + \alpha_1 GDP\_R_{c,t-1} + \alpha_2 GINI_{c,t} + \alpha_3 GINI_{c1,t-1} + \alpha_4 HD_{c,t-1} + \alpha_5 EDU_{c,t} +$$
$$\alpha_6 INF_{c,t} + \alpha_7 CC\_E_{c,t} + \alpha_8 GCF_{c,t} + \eta_c + \gamma_t + \varepsilon_{c,t} ----------(equ1)$$

$$Gini_{c,t} = B_0 + B_1 GDP\_R_{c1,t-1} + B_2 GINI_{c,t-1} + B_3 HD_{c,t-1} +$$
$$B_4 INF_{c,t} + B_5 INF_{c,t-1} + B_6 Health_{c,t} + \eta_c + \gamma_t + \varepsilon_{c,t} ----------(equ2)$$

$$GDP\_R_{c,t} = B_0 + B_1 GDP\_R_{c1,t-1} + B_2 GINI_{c,t} + B_3 GINI_{c,t-1} + B_4 HD_{c,t} + B_5 HD_{c,t-1}$$
$$B_6 EDU_{c,t} + B_7 INF_{c,t} + B_8 INF_{c,t-1} + B_9 GE\_E_{c,t} + B_{10} GCF_{c,t} +$$
$$B_{11} Health_{c,t} + \eta_c + \gamma_t + \varepsilon_{c,t} ----------(equ3)$$

$HD_{c,t}$ = Human Development Index for country "c" at time "t" taken from UNDP reports, 2003, 2006, 2015 and 2016.

$GINI_{c,t}$ = Income inequality for country "c" at time "t" measured by Gini coefficient. It ranges in 0 to 1. Taken from UNDP reports.

$GDP\_R_{c,t}$ = Economic Growth for country "c" at time "t" measured by growth rate of real GDP (percent), and its data collected from Asian Development Bank (2017) for each SAARC countries.

$EDU_{c,t}$ = It is expenditure on education of a country, c at time, t, as percent of GDP at current market price taken from Asian Development Bank Report 2017.

$INF_{c,t}$ = It is Inflation rate of a country , c at time, t, collected from form SAARC in Figures (2014), SAARC Group of Statistics from 2005 to 2015

$CC\_E_{c,t}$ = it is the control of corruption, percentile rank of a country, c, at time, t, collected from Governance indicators published world bank...(year).

$GCF_{c,t}$ = It is the GCF on percent of GDP at current prices of a country , c at time, t, taken from Asian Development Reports 2017.

$Health_{c,t}$ = health expenditures as percentage of GDP, taken from Asian Development Bank (2017)

$GE\_E_{c,t}$ = is the estimate of governance effectiveness measured by world bank.

**Results and Discussions**

Table No.1 reveals the estimated results for equation (1) of the study. One of the important test in panel data analysis is whether to opt for Fixed Effect Model (FEM) or Randoom effect model (REM). It can be checked by using Hausman Test. Hausman Test statistic has Chi-square distribution with the null hypothesis that both FEM and REM

estimates do not differ substantially, however if this null hypothesis is rejected, we say that REM is not appropriate. In the present study, Husman Test is carried out, for which value of chi square statistics is 14.7879 with P-value is 0.0052, which means that null hypothesis is rejected, and FEM is appropriate for the present study. Table No.1 present results of FEM and REM models for various specifications. It is evident that, in the first version of FEM, one year lag HDI has positive impact of HDI in the selected countries. It is highly statistically significant along with one year lag HDI, the education variable also shows positive impact on HDI which is as per theory. The Gross Capital Formation has positive impact on HDI and significant at one percent level of significance. In another version of FEM, which excludes **control of corruption** (CC-E) as explanatory variable, also gives the same results for HDI(-1), Edu, and GCF.

In the third version of FEM, given in column (3), excludes INF and CC_E, however results do not changes for HDI (-1), Edu and GCF. In column (1) to (8), all FEMs shows that GDP growth (GDP_R) at lag one negatively impact on HDI, but not statically significant. In column (6) and (7) fixed effect model shows that Gini coefficient are negatively correlated to HDI. It means that extreme inequality can results in lower HDI vise versa. Two versions of REM are estimated to allow cross sectional variations. Both the REMs are given in column (9) and (10). In both the models, statistically significant relationships are not established between HDI and gdp_growth. However gini-cofficient still negative, but insignificant. Control of corruption has a positive impact on HDI, but it also statistically insignificant

**Table 1**
**Estimated results of Equation (1). Dependent Variable is HDI**

| Variable | Fixed Effect Model | | | | | | | | Random Effect Model | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Constant | 0.056809 | 0.050760 | 0.135112 | -0.016991 | -0.014144 | 0.188196** | 0.197344** | 0.188196** | 0.088912** | 0.088832** |
| GDP_R(-1) | -0.001063 | -0.001102 | -0.000701 | -0.000986 | | | -0.001219 | | | -0.000592 |
| GINI | -0.209250 | -0.207167 | -0.281376 | | | | | | | |
| GINI(-1) | | | | | | -0.360607** | -0.377804*** | -0.360607** | -0.154977** | -0.150416*** |
| HDI | | | | | | | | | | |
| HDI(-1) | 0.696412* | 0.698004* | 0.766157* | 0.799864* | 0.805067* | 0.761172* | 0.752271* | 0.761172* | 0.916642* | 0.916192* |
| EDU | 0.022226** | 0.022188** | 0.017494** | 0.018253** | 0.016828** | 0.014022*** | 0.015559*** | 0.014022** | 0.000303 | 0.000207 |
| INF | -0.000939 | -0.000935 | | | | | | | | |
| CC_E | 0.006927 | | | | | | | | | |
| GCF | 0.004898* | 0.004918* | 0.002478** | 0.002763* | 0.002575* | 0.002189* | 0.002366*** | 0.002189* | 0.001140** | 0.001212** |
| R Sqaure | 0.912205 | 0.912182 | 0.917750 | 0.916284 | 0.918858 | 0.922922 | 0.920837 | 0.922922 | 0.912482 | 0.908890 |
| F-stat | 52.64344* | 57.12950* | 90.12312* | 100.3300* | 120.4471* | 115.7482* | 97.53070* | 115.7482* | 323.2137* | 233.4326* |

Note: *, **, *** represent significance at one percent, five percent and 10 percent respectively. Hausman Test concludes that REM is not appropriate for the said sample.

**Table 2**
**Estimated results of Equation (2). Dependent variable is GINI**

| **Variable** | **Fixed Effect Model** | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Constant | | 0.098575* | 0.155996* | 0.153932* | 0.048593** | |
| GDP_R(-1) | **0.000985**** | 0.001018* | 0.001046* | 0.001027* | 0.001096* | |
| GINI(-1) | **0.935047*** | 0.736082* | 0.607993* | 0.634487* | 0.843805* | |
| HDI | **0.034428*** | 0.009426 | 0.002728 | 0.005196 | 0.026614* | |
| INF | -0.000343 | -0.000594 | | | -0.000707** | |
| INF(-1) | | | -0.000653*** | -0.000785** | | |
| Health | 8.51E-05 | 0.001813 | 0.002677 | | -0.000946 | |
| Health | | | | -0.001848 | | |
| R Sqaure | **0.923722** | 0.939261 | 0.941587 | 0.937500 | 0.885004 | |
| F-stat | | 88.02552 | 85.55785* | 79.61482* | 126.2133 | |

Note: *, **, *** represent significance at one percent, five percent and 10 percent respectively. Hausman Test concludes that FEM & REM are same for this model

**Table No.3**
**Estimated results of Equation (3). Dependent variable is GDP_R.**

| Variable | Fixed Effect Model | | | | | Random Effect Model | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6 | (9) | (10) | 11 |
| Constant | 10.22276 | 18.79269 | 10.16611* | 23.30860* | 31.54645* | | -3.260253 | 9.695744* | 7.281833* |
| GDP_R(-1) | -0.365213* | | | | -0.209934** | | -0.332134* | -0.122889 | |
| GINI | 12.53116 | -16.06775 | | | | | 29.44536** | | |
| GINI(-1) | | | | -25.96440** | -36.25771* | | | | |
| HDI | -5.257512 | -2.703887 | | | | | -1.957077 | | |
| HDI(-1) | | | | -10.35181* | -11.95298* | | | | |
| EDU | -0.376871 | -1.239532** | -1.244842** | | | | -1.040115* | | |
| INF | -9.04E-05 | | | | | | -0.038441 | -0.139758 | -0.172093** |
| INF(-1) | | | | | | | | -0.231471** | |
| GE_E | 4.858700 | | | | | | 2.278211 | | |
| GCF | 0.008354 | | | | | | 0.089777 | | |
| Health | -0.260932 | | | | -0.782357 | | 0.974686* | 0.336118** | 0.282458 |
| R Sqaure | 0.352792 | 0.228271 | 0.207354 | 0.236455 | 0.285532 | | 0.291767 | 0.153617 | 0.060990 |
| F-stat | 2.316669* | 3.038588* | 3.517036* | 3.747136* | 3.396968* | | 3.913665* | 3.266962** | 2.727951*** |

Note: *, **, *** represent significance at one percent, five percent and 10 percent respectively. Hausman Test concludes that FEM & REM are same for this model

Table No (2) represent estimated results for equation (2). The selection between Fixed Effect and random effect model for analysis has been taken using Hausman test. The value of chi-square statistics is 5.54 with the P-value is 0.35 which shows that null hypothesis can not be rejected. So it shows that both FEM and REM estimates are same for the data. It is therefore the reason that table No.2 only reports results of FEMs. There are various determinants of Gini Coefficient which is a measure of nature of distribution of wealth among the people. It value of Gini Coefficient is near 1, it shows extreme inequality of wealth among the people and vice versa. Table No.2 shows that one year lag GDP growth has a positive on Gini Coefficient, that is, growth in these selected SAARC countries promotes income inequality among the people. One year lag Gini Coefficient is positively correlated with current Gini Coefficient. It means that inequality in the previous year is correlated with inequality in the current year. HDI has positive impact on Gini coefficient and statistically significant (see column 1 & 2), whereas inflation is negatively correlated with income distribution, and statistically significant (see column 6 of table No.2. one year lag INF also bear the same relationship and significant as well. Health variable do not establish any statistically valid relationship with Gini Coefficient.

Table No.3 reveals that estimated results of equation (3) dependent variable is growth of GDP. Though Hausmant Test identified that both FEM and REM models are same for the current sample, however results of both FEM and REMS are reported for comparison.

Growth equation to the selected countries shows that one year lag GDP bear negative impact on the current output of the selected countries (see column No.1 & 6). In case of human development expected theoretical relationship between HDI and GDP growth is positive, however one year lag HDI shows that HDI de-rail growth process in the sampled countries (see column No.4 & 5). These results are statistically significant. The same is the case with education. It do no promote growth. These results are not as per standard theory. The present paper could not establish any causal link between negative relationship

between edu, HDI and growth. In column (10) the REM version of the equation shows inflation effect growth process, which is statistically significant. Interestingly, GDP growth is positively correlated to health variable (see column 9 & 10). However governance and gross capital formation do not have any significant correlation with GDP growth.

## Conclusion

The present study analysis the relationship amongst the human development, economic growth and income inequality in the SAARC countries for the period of 2000 to 2016.

Three models have been developed using literature is a guide. The determinants of HDI is taken from the Blinder and Georgiadis (2010), in which they estimated determinants of Human Development for 84 countries using ARDL approach. The present study incorporate inflation, control of corruption and gross capital formation as other macro Variables.

The equation for income inequality is adopted from Roine et. al (2009), in which they tested the determinates of income inequality for 16 countries while in our analysis, inflation and expenditures in health are added to standardized the results. Finally, the equation (3) is also adopted from Blinder and Georgiadis (2010) and Roine et. al (2009), which is a growth equations.

These equations are separately estimated using panel data econometrics techniques. These model are tested for fixed effect and random effect using Hausman test. Different version of the all three equations reports that education affect HDI significantly. However, when control of corruption variable is excluded from the equations, the results have been unchanged. In the other hand, income inequality and HDI are negatively correlated. It means that higher income inequality leads to lower HDI. The impact of HDI on Gini coefficient is positive and significant. It means that HDI increase income inequality. However, health variable do not establish statistically valid relationship with Gini coefficient.

This type of result is reported in the literature of HDI and growth relationship in case of the developing countries as per Rahman, Raja and Ryan (2020) paper. However, health variable and GDP are positively related to GDP, whereas, there is no significant relationship established between control of Governance and GDP and Gross Capital Formation and GDP.

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