

## **RELATIONSHIP BETWEEN DIFFERENT TYPES OF GLOBALIZATION AND HUMAN DEVELOPMENT INDEX: EVIDENCE FROM PANEL DATA**

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### **ABSTRACT**

The study analyzes the impact of economic, political and social globalization on human development index (HDI). The three components of HDI, i.e. income, health and education are also used to establish their link to the dimensions of globalization. A relatively large panel of 129 countries over the period of 1990 to 2019 has been examined by applying the panel data econometric techniques. Results indicate cointegration among all the three categories of globalization and HDI. Moreover, the results of dynamic ordinary least square (DOLS) shows beneficial effect of globalization on HDI and its components. Economic and social globalization has more pronounced effect on HDI. Positive impact of economic, political and social globalization is found on per capita income and education but the impact of social globalization is more dominating. It is pertinent to highlight that life expectancy is considerably affected by economic globalization while political globalization turns out to be insignificant. It is concluded that economic and social linkages are instrumental in generating favorable effect on human welfare. Hence, the study provides evidence in support of globalization; therefore, there is no harm in supporting and promoting the policies that create more global integration.

**Key words:** Globalization, HDI, Income, Health, Education

**JEL Classification:** F6, F43, I15, I31

### **1. INTRODUCTION**

Globalization is the diffusion of information, ideas, culture, technology and skills among different state. Globalization defines varieties of phenomena which translate in economic, financial, political, social, cultural, environmental and technological structures of the societies. It strengthens mutual connections and communications which lead to the shrinkage of distance in a new global system. It is also defined as a phenomenon of economic integration between different countries through trade liberalization, investment, capital flows and spread of technological advancement (Torres, 2001). Moreover, it strengthens and develops the relationship by declining geographical restraints on cultural and social arrangements (Waters, 1995). It is also known as a process of transformation of economic, social, political and cultural foundations of societies (Mittelman, 2000).

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There are three major perspectives of globalization; economic, social, and political globalization.

Economic globalization is considered to be an important pillar and strongest force of globalization, which serves as a foundation for other components. It is the free movement of goods, capital, services and foreign direct investment. It has created a new regime of trade, where all the economies are interdependent in a global market. Social globalization is described as the flow of people, ideas and information across boundaries. Social relation and networks are intensified by the transmission of cultural values through internet, media and tourism around world. Political globalization is the expansion and strengthening of political relation across the globe with the emergence of global political system and global governance. International political body can influence the activities of nation state through a network of national, international and non-government organizations. The importance of nation state is declining as a consequence of political globalization.

The pace of globalization has been increasing during the past few decades due to various factors. Government policies and the national and international organizations play substantial part in the evolution of flat world. Many developed and developing countries followed the economic opening policies. In this regard, countries made efforts to reduce trade barriers through participation in regional and international trading contracts. Arrangements were made to lift trade and capital controls. Financial liberalization was initially adopted by developed economies in the 1970s, while it started in developing economies during the 1980s.

The wave of globalization which is accompanied by lower transportation, communication and information cost; developed the national companies into multinationals ones to seek higher profit in the new global markets. Subsequently, today countries are more integrated in economic, financial, political and cultural relations. However, policies of liberalization do not guarantee the benefits of globalization. Some countries are experiencing high growth rates and economic development due to globalization, while other countries are unable to extract the benefits of globalization. It is very difficult to conclude some concrete result regarding the outcome of globalization in terms of economic and social performance of a country. The reason is the differences in the structure and ongoing policies of various countries. The benefit from opening of the boarder critically depends on human capital and institutions of a country.

Globalization provides opportunities for economic growth and development and it imposes challenges on policy makers in formulating and managing national policies. Socio-economic performance of a country has always been the prime objectives of policy makers. Provision of better facilities and good quality of life are the indication of good governance that can be measured by one of the most popular indicators i.e. human development index (HDI). Countries with poor socio-economic performance cannot perform well in the ranking of HDI.

The effect of globalization on human welfare is the most controversial issues among scholars, policy makers, politician and general public. Proponents of globalization discuss beneficial and positive effects on human welfare, HDI and other socio-economic variables (for example, Dollar, 1992; Dreher, 2006; Sapkota, 2011; Dogan 2013; Lee, 2014 and

Hasan and Waheed, 2021), while other argue weak and negative effect on these variables (for example, Rodriguez and Rodrik, 2000; Umaru et al., 2013 and Kiani et al., 2021). The disagreement in consequences is because of differences in sample size, data, methodology and estimation procedures. Contradictory and inconclusive results regarding the direction and influence of globalization has received great deal of attention in the literature. Unsettled controversy on the direction and relationship between globalization and human welfare remains very much an open question. Therefore, in the current study this issue has been estimated by using a relatively large panel of developed and developing countries in order to examine the nature of association between globalization and human welfare across globe.

Reviewing the existing literature, one observes the following findings. The studies are mostly focused in analyzing the relationship between globalization and socioeconomic indicators, including, per capita income, poverty or unemployment. Limited literature is found on the composite index of human welfare i.e. HDI. Moreover, the dimensions of globalizations have not gained due importance in effecting the human welfare. There are various studies that have shown the impact of overall globalization on HDI but how the dimensions of globalization are affecting the welfare is quiet limited. In this study, three major dimensions of globalization i.e. economic, political and social globalization are taken into account to study their impact on the composite index of HDI. Additionally, the relationship is also studied by decomposing HDI into its three components i.e. income, health and education. The analyses will help to understand which dimension of globalization has more pronounced effect on HDI and its components. The study also uses a comparatively large sample of 129 developed and developing countries in order to provide empirical evidence of the consequences of globalization on HDI.

The current study contributes to the existing literature in many aspects. First, three major dimensions of globalization index (economic, political and social) are used to examine their impact on human welfare. Each dimension may differ in effecting human welfare; therefore, instead of using overall globalization index, three dimensions are taken into consideration. Human welfare is measured by a composite index of HDI. It is considered that HDI is a reliable index for providing an alternative view of human welfare or human development (Al-Hilani, 2012). Second, HDI is decomposed into its components; i.e. income, education and health. The relationship of each of the three dimensions is also studied with different types of globalization. This analysis contributes in a literature by providing an insight that how the aspects of HDI are affected by different categories of globalization. The third difference is in context of policy suggestions that provides guidance in strengthening that dimension of globalization which has dominating effect on HDI.

The remainder of the paper is organized as follows, Section 2 describes literature review. Theoretical framework and empirical model is presented in Section 3 and 4 respectively. Data discussion is provided in Section 5. Empirical results are displayed in Section 6 and last section provides summary and conclusion of the study.

## **2. LITERATURE REVIEW**

Literature review is distributed into four sections. Section 2.1 presents literature on globalization and HDI. The association between globalization and the components of HDI

is discussed in the subsequent sections. Relationship between per capita income and globalization is presented in Section 2.2, while Section 2.3 deals with health and globalization. The last section discusses the association between education and globalization.

### **2.1. Globalization and Human Development Index (HDI)**

Quantification of globalization effects on human welfare is not an easy task. Different indicators are used to measure human welfare. However, United Nations developed HDI to measure the concept of human welfare. Three major areas are used to rank social and economic performance of a country on human development; life expectancy at birth, education and per capita gross national income.

One of the key objectives of the government is to improve the performance of a country in the ranking of HDI. Hence, it is critically essential to determine the influence of globalization in improving the value of HDI. Existing theoretical and empirical literature is limited on this issue. There are two contradictory views in response to the human welfare effects of globalization. Soros (2000) and Guillen (2001) considered globalization as a great risk to society and argue that government became powerless to improve the quality of life of citizens in the presence of globalization. Likewise, Scott (2001) highlighted the adverse impacts of globalization on quality of life through job elimination in manufacturing sector. Hasan and Waheed (2021) also showed negative impact of trade openness in selected South Asian countries. In contrast, several studies showed the positive influence of globalization on human welfare (Sirgy et al., 2004; Tsai, 2007; Shahrabi, 2011; kiani et al., 2021). Sapkota (2011) showed that globalization promote human and gender development and decreases human poverty.

The relationship between globalization and HDI is further explored in the literature by disaggregating HDI into its three components, i.e. income, health and education. Literature with respect to these three dimensions is explained below.

### **2.2. Globalization and Per Capita Income**

The literature on the relationship between globalization and per capita income reveals contradictory and inconclusive results. On the basis of theoretical description and empirical findings, the literature is categorized into two groups. The first category deals with the studies that provide evidence to support globalization on the basis of its progressive impact on per capita income. Dollar (1992), Frankel and Romer (1996) and Greenway et al. (1999) observed that trade liberalization and actual trade flows are positively related to economic growth. Brunner (2003) extended the work of Frankel and Romer (1996) and found a positive impact of trade on income level. Stiglitz (2006) considered globalization as a strong force of economic growth. Dreher (2006) examined the effect of globalization on the growth by using Konjunkturforschungsstelle (KOF) index in 123 countries over the period of 1970-2000. The study found positive influence of globalization on economic growth. Additionally, the studies of Afzal (2007), Shaik and Shah (2008), Polasek and Sellner (2011), Rao and Vadlamannatio (2011), Mutascu and Fleisher (2011), Meraj (2013) and Hasan (2019) also found positive connotation between globalization and economic growth.

The second category of literature consists of studies which deny the positive effect of globalization on economic growth. Rodriguez and Rodrik (2000) refuted the results of Dollar (1992), Edwards (1998) and Frankel and Romer (1999), which shows positive association of globalization and economic growth. It was pointed out that the studies used inappropriate measure of openness. Umaru et al. (2013) also found adverse effect of globalization on petrol, manufacturing industry and solid mineral sector of Nigerian economy.

Contradictory results regarding the direction and relationship between economic growth and globalization has received great deal of attention in the literature. Rodriguez and Rodrik (2000) also concluded that the direction and association between trade openness and economic growth is ambiguous and open question. Unsettled controversy is due to methodology, data and estimation technique. According to Baldwin (2003) the disagreement in results is due to differences in defining and treating this question. Some of the studies used FDI, trade policy and capital liberalization as the proxies of globalization. However, it is necessary to incorporate all the important aspects of globalization, as they are strongly associated in describing its consequences. Ignoring the significant variable may produce biased results (Dreher, 2006).

### **2.3. Globalization and Health**

There are various channels through which globalization may affect health directly or indirectly. Bergh and Nilsson (2010) highlighted the effect of globalization on life expectancy through four channels i.e. income, education, nutrition and public health. The first channel shows that if the effect of globalization on income is positive, it may be beneficial for life expectancy as well. The second channel indicates that globalization improves education level, which increases awareness of health among individuals, hence improves life expectancy (Stark, 2004). The third channel suggests that globalization gives access to new medical technologies and pharmaceuticals which in turn improves life expectancy (Papageorgiou et al., 2007). Finally, according to fourth channel globalization affects the nutrition intake through availability of imports and relative prices change in the presence of more open economy. On the other hand, Mendez and Popkin (2004), Yach et al. (2007), Kawachi and Wamala (2007) and Blouin et al. (2009) highlighted negative consequences of globalization in terms of inequality, food insecurity, unhealthy food, polluted environment and spread of infectious diseases.

Stevens et al. (2013) showed positive and favourable effect of trade on health in lower income countries. Similarly, Herzer (2017) analyzed the connection between health and trade openness in 74 countries and found that trade openness has beneficial effect on life expectancy and infant mortality rate. Furthermore, the study found bidirectional causality between trade and life expectancy. Owen and Wu (2007) also showed that trade openness decreases infant mortality rate and increases life expectancy in developing countries. The study concluded that improvement in health is due to knowledge spillover as a result of higher interconnectivity. Alam et al. (2015) and Ling et al. (2017) also reported positive association between trade openness and life expectancy in case of Pakistan. The study of Novignon and Atakorah (2016) also showed positive association between these two variables in 24 Sub Saharan African countries.

Bergh and Nilsson (2010) examined the effect of KOF index on life expectancy in 92 countries and found that life expectancy is positively affected by economic globalization but negatively affected by political globalization. However, the study of Rafat et al. (2013) showed positive effect of political and social globalization on life expectancy.

#### **2.4. Globalization and Education**

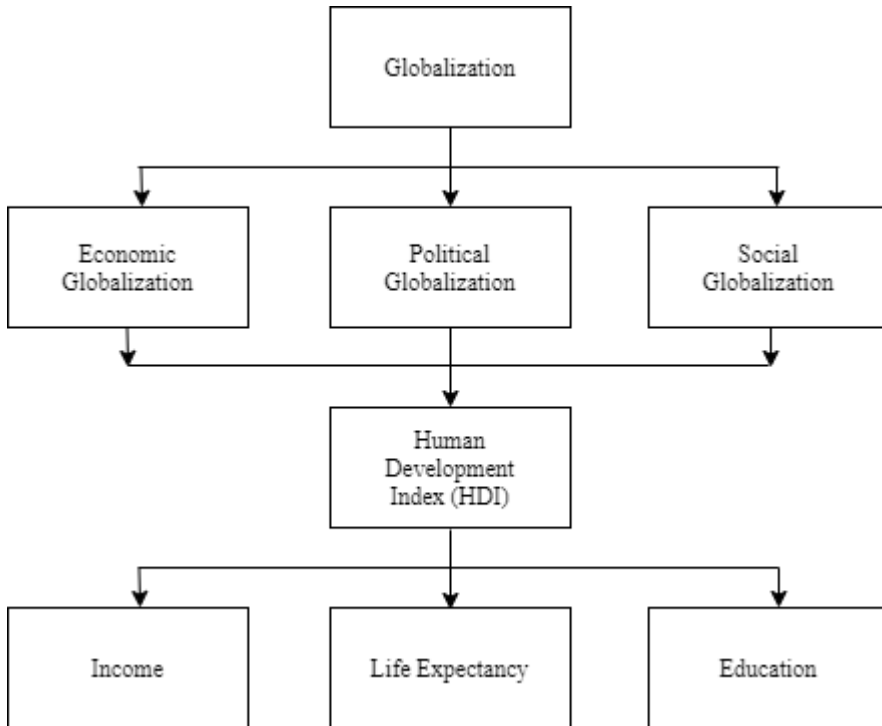
Education is the foremost concern for all the countries and considered as an important driving factor of economic, social, and human development. The effect of education is evident in the form of scientific progress, which brings economic, social and cultural change in the societies. The provision of primary and secondary schooling has increased during the 1990s across the globe, but it is inadequate as there exist differences in education achievements across countries and regions.

Limited empirical literature is found regarding the relationship between globalization and education. The study of Fors (2017) investigated the association between primary school enrollment and globalization by using sub-indices of KOF index. The results showed weak link between economic globalization and primary school enrollment for full panel. While, it is found to be positive in Latin America, Caribbean and Asia and slightly negative in Eastern Europe. The association between social globalization and primary school enrollment is found to be highly significant.

### **3. THEORETICAL FRAMEWORK**

All the categories of globalization such as economic, political and social globalization can directly or indirectly affect the daily life of individuals. Globalization has increased the level of investment and production. It helps in boosting technology transfer, restructuring of industrial sector and the development of global companies. It plays a significant role in maximizing wealth of the world. Importance of globalization cannot be denied from needle to industrial machineries. Globalization gained its strength from the opportunities unlocked by technologies, policies and strategies. It boosts free trade, increases access to modern technology, healthcare facilities, education, media, consumer goods and many other resources. In this study, three dimensions of globalization namely, economic, political and social globalization are used to analyze their impact on socioeconomic human welfare. Generally, HDI is used to rank human welfare or socioeconomic performance of a country. Figure 1 shows that different types of globalization influences HDI.

**Figure 1: Relationship between Globalization and HDI**



The relationship of three dimensions of globalization and HDI is presented in Figure 1. Economic, political and social aspect of globalization is affecting HDI and its components. Economic globalization promotes international trade among different regions across globe. Several international organizations and trading agreements have advanced the flow of goods and services. The importance of international trade and its benefits are widely recognized. Economic integration expands and improves the market size for consumers and producers. It also provides better opportunities to all the agents of society in order to maximize their shares. It favorably affects income level by higher investment, which directly translates in human welfare through higher per capital income. Furthermore, economic globalization may also have valuable effect on health and education sector. For instance, free movement and higher mobility allows to get better health and educational services and facilities. Likewise, lower trade restrictions helps in importing quality products and equipment that can improve the performance of these sectors. Therefore, economic globalization influences HDI and its components.

Social globalization increases the trans-border flow of information through internet that has enabled firms to participate and coordinate in the global value chains. It has also empowered small businesses and firms to realize their share in the global trade. Moreover,

it has provided connectivity on huge scale that can open new ventures from financial to professional services, hence, effecting income level. Social integration is making it possible to acquire information at low cost, therefore, creates multiple chances to reorganize the traditional structure of economy into more advanced structure through affecting the income level. Additionally, social globalization increases the access to the medical services and generates positive impact on life expectancy. Information and communication networks provide better opportunities to access higher education. Social networking and less costly flow of information across globe has enabled individuals to acquire knowledge with almost zero cost. Hence, the three components of HDI i.e. income, health and education are affected by social globalization.

Political globalization imposes standardized laws to all the countries to settle down different issues such as resource division and other points of conflicts. Therefore, government policies and global networks are also important in influencing the output and growth of a country (Husain, 2006 and Kilic, 2015). Furthermore, it paves the way for collaborative efforts to overcome malnutrition faced at any part of the world. Let alone there will be more hunger and starvation, therefore, the global policies are aimed at reducing poverty and inequality. The global political structures help the low income countries through financial assistance in order to increase production and basic health care facilities. Therefore, the third dimension of globalization is also affecting the components of HDI. It can be concluded from the above discussion that the dimensions of globalization is affecting HDI and its components through various channels.

#### 4. EMPIRICAL MODEL

Model specifications have been provided from equation 1 to 4 in order to develop a link between globalization and HDI. Model 1 is constructed to determine the relationship between three types of globalization and HDI. Model 2, 3 and 4 examine the association between the components of HDI and globalization.

$$\text{Model 1: } HDI_{it} = \alpha_1 EGI_{it} + \alpha_2 PGI_{it} + \alpha_3 SGI_{it} + \mu_{it} \quad (1)$$

Where EGI, PGI and SGI are economic, political and social globalization index, respectively

$$\text{Model 2: } Income\ Index_{it} = \beta_1 EGI_{it} + \beta_2 PGI_{it} + \beta_3 SGI_{it} + \mu_{it} \quad (2)$$

$$\text{Model 3: } Life\ Expectancy\ Index_{it} = \gamma_1 EGI_{it} + \gamma_2 PGI_{it} + \gamma_3 SGI_{it} + \mu_{it} \quad (3)$$

$$\text{Model 4: } Education\ Index_{it} = \theta_1 EGI_{it} + \theta_2 PGI_{it} + \theta_3 SGI_{it} + \mu_{it} \quad (4)$$

#### 5. DATA AND VARIABLES

The present study uses balanced panel data of 129 developed and developing countries over the period of 1990 to 2019<sup>2</sup>. Annual data of variables are collected from various sources. Detail of each variable is provided below.

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<sup>2</sup> See appendix-I for list of countries



### 5.1. Human Development Index

HDI is a composite index of education, life expectancy and income. Data on HDI and its components are collected from UNDP and human development report.

The indices of education, life expectancy and income are constructed as follows in HDI:

$$\text{Education Index} = \frac{\text{MYS Index} + \text{EYS Index}}{2}$$

$$\text{MYS Index} = \frac{\text{MYS}}{15} \quad \text{and} \quad \text{EYS Index} = \frac{\text{EYS}}{18}$$

15 years of education is taken as the maximum estimated value of this indicator for 2025 and 18 years of education is equivalent to a master's degree in most countries. The education index is constructed by taking average of these two components i.e. mean year of schooling (MYS) and expected year of schooling (EYS).

$$\text{Life Expectancy Index} = \frac{\text{LE} - 20}{85 - 20}$$

Life expectancy of 20 years and 85 years is the minimum and maximum value documented by United Nation Organization (UNO) respectively. The index follows the normalization procedure by assigning maximum and minimum values of life expectancy. Therefore, the index ranges from 0 to 1 by taking value 1 if life expectancy at birth is 85 and 0 if it is 20.

$$\text{Income Index} = \frac{\ln(\text{\$GNI per capita}) - \ln(\text{\$100})}{\ln(\text{\$75,000}) - \ln(\text{\$100})}$$

\$75,000 and \$100 is the maximum and minimum value of GNI per capita recorded by UNO respectively. The index takes value 1 if GNI per capita is \$75,000 and 0 in case of \$100. Present study has constructed these three indices by using data on MYS, EYS and life expectancy at birth and GNI per capita, extracted from UNDP human development report.

### 5.2. Economic Globalization Index

Economic globalization is explained as the flow of goods, services and capital. KOF index of economic globalization is obtained from ETH Zurich database. It is comprehensive index and derived with the help of eight variables. It includes trade, FDI, portfolio investment and foreigners' income, while import constraints, tariff, trade taxes and capital account restrictions are also taken into consideration.

### 5.3. Political Globalization Index

Political globalization is referred as a dissemination of government policies. It is constructed by including number of embassies, affiliation with international organizations, participation in UN missions of peace keeping and international agreements between two or more countries. Data on this index are also collected from ETH Zurich database.

#### 5.4. Social Globalization Index

It is characterized by spread of information, ideas and people. This index is also obtained from ETH Zurich database, which shows three dimension i.e. personal contacts, information flows and culture. Personal contact includes international tourism, foreign population, transfers, telephone traffic, and international letters. All these variables have some potential to receive and spread information to other countries. Internet users, television and trade in newspaper are in the category of information flows. Cultural dimension is measured by number of McDonald restaurants, Ikea outlets and trade in international books.

### 6. RESULTS AND DISCUSSION

Panel unit root tests are employed to check the stationarity of the selected variables. In this regard, various tests are available, all the given tests have common null hypothesis of non-stationarity for all individuals. However, these unit root tests diverge on alternative by allowing autoregressive coefficient to be homogeneous or heterogeneous. Levin et al. (2002) allow homogeneous autoregressive coefficient under alternative hypothesis, while remaining tests imposes heterogeneity. All the tests are asymptotically normally distributed, which simplifies their application. The results of unit root are presented in Table 1. The results indicate that all the selected variables are stationary at first difference. Hence, it is suggested to apply Pedroni (1999) and Kao (1999, 1990) panel cointegration tests to observe the long-run relationship among the selected variables of the current study.

**Table 1: Results of Unit Root Test**

|            | Levin,<br>Lin &<br>Chu t-<br>test | Im,<br>Pesaran<br>and Shin<br>W-<br>statistic | ADF -<br>Fisher Chi-<br>square<br>statistic | PP - Fisher<br>Chi-square<br>statistic | Order of<br>Integration |
|------------|-----------------------------------|---|---|--|-------------------------|
| $EGI_{it}$ | -9.198<br>(0.000)                 | -27.560<br>(0.000)                            | 1238.41<br>(0.000)                          | 2075.02<br>(0.000)                     | I(1)                    |
| $SGI_{it}$ | -18.932<br>(0.000)                | -34.576<br>(0.000)                            | 1560.42<br>(0.000)                          | 1676.83<br>(0.000)                     | I(1)                    |
| $PGI_{it}$ | -4.759                            | -31.951                                       | 1437.86                                     | 2254.38                                | I(1)                    |

|                               |         |         |         |         |      |
|-------------------------------|---------|---------|---------|---------|------|
|                               | (0.000) | (0.000) | (0.000) | (0.000) |      |
| $HDI_{it}$                    | -2.862  | -15.040 | 709.844 | 1038.85 | I(1) |
|                               | (0.002) | (0.001) | (0.002) | (0.001) |      |
| Income Index $_{it}$          | -6.397  | -24.021 | 1080.88 | 1519.14 | I(1) |
|                               | (0.000) | (0.000) | (0.000) | (0.000) |      |
| Life Expectancy Index $_{it}$ | -5.038  | -4.311  | 400.719 | 724.267 | I(1) |
|                               | (0.000) | (0.000) | (0.000) | (0.000) |      |
| Education Index $_{it}$       | -15.639 | -28.156 | 1253.01 | 1258.66 | I(1) |
|                               | (0.000) | (0.000) | (0.000) | (0.000) |      |

Note: probability values are given in brackets.

The next step is to determine the cointegration relationship among the variables by applying the cointegration test of Pedroni (1999) because all the selected variables are stationary at first difference. The Pedroni (1999) cointegration test is based on the pooling within dimensions and between dimensions. It allow for heterogeneity in the autoregressive term. There are total seven statistics, divided into two parts. The first part shows four statistics including panel v-statistics, panel rho-statistics, panel PP-statistics and panel ADF-statistics, while the second part indicates three statistics comprising group rho-statistics, group PP-statistics and group ADF-statistics. The null hypothesis of panel cointegration test shows no cointegration against the alternative hypothesis of cointegration. Kao test of cointegration is also applied, it allows homogeneous coefficients. The results of cointegration tests are presented in Table 2.

**Table 2: Results of Cointegration Test**

|   | Pedroni Cointegration Tests |       |                       |       | Kao Cointegration Test |        |       |
|---|-----------------------------|-------|-----------------------|-------|------------------------|--------|-------|
|   | Statistic                   | Prob. | Weighted<br>Statistic | Prob  | t-<br>Statistic        | Prob   |       |
| <b>Model 1</b>                          |                             |       |                       |       |                        |        |       |
| Common AR Coefficients Within Dimension |                             |       |                       |       |                        |        |       |
| Panel v-Statistic                       | 2.908                       | 0.002 | -0.947                | 0.828 | ADF                    | -3.435 | 0.000 |

|                     |        |       |         |       |
|---------------------|--------|-------|---------|-------|
| Panel rho-Statistic | -1.852 | 0.032 | -2.892  | 0.002 |
| Panel PP-Statistic  | -7.969 | 0.000 | -9.408  | 0.000 |
| Panel ADF-Statistic | -8.942 | 0.000 | -10.129 | 0.000 |

Individual AR Coefficients Between Dimension

|                     |         |       |
|---------------------|---------|-------|
| Group rho-Statistic | 1.315   | 0.905 |
| Group PP-Statistic  | -9.596  | 0.000 |
| Group ADF-Statistic | -10.652 | 0.000 |

**Model 2**

Common AR Coefficients Within Dimension

|                     |        |       |        |       |     |        |       |
|---------------------|--------|-------|--------|-------|-----|--------|-------|
| Panel v-Statistic   | 3.013  | 0.001 | 0.207  | 0.417 | ADF | -3.494 | 0.000 |
| Panel rho-Statistic | -1.643 | 0.050 | -2.162 | 0.015 |     |        |       |
| Panel PP-Statistic  | -7.620 | 0.000 | -8.483 | 0.000 |     |        |       |
| Panel ADF-Statistic | -8.186 | 0.000 | -9.086 | 0.000 |     |        |       |

Individual AR Coefficients Between Dimension

|                     |         |       |
|---------------------|---------|-------|
| Group rho-Statistic | 1.279   | 0.899 |
| Group PP-Statistic  | -9.896  | 0.000 |
| Group ADF-Statistic | -10.596 | 0.000 |

### Model 3

#### Common AR Coefficients Within Dimension

|                     |        |       |         |       |     |        |       |
|---------------------|--------|-------|---------|-------|-----|--------|-------|
| Panel v-Statistic   | 1.437  | 0.075 | -1.909  | 0.971 | ADF | -3.533 | 0.000 |
| Panel rho-Statistic | -1.121 | 0.131 | -3.717  | 0.000 |     |        |       |
| Panel PP-Statistic  | -6.981 | 0.000 | -11.413 | 0.000 |     |        |       |
| Panel ADF-Statistic | -7.762 | 0.000 | -12.749 | 0.000 |     |        |       |

#### Individual AR Coefficients Between Dimension

|                     |         |       |  |  |
|---------------------|---------|-------|--|--|
| Group rho-Statistic | 1.474   | 0.929 |  |  |
| Group PP-Statistic  | -10.163 | 0.000 |  |  |
| Group ADF-Statistic | -11.190 | 0.000 |  |  |

### Model 4

#### Common AR Coefficients Within Dimension

|                     |        |       |        |       |     |        |       |
|---------------------|--------|-------|--------|-------|-----|--------|-------|
| Panel v-Statistic   | 2.368  | 0.008 | -0.713 | 0.762 | ADF | -3.188 | 0.001 |
| Panel rho-Statistic | -1.187 | 0.117 | -2.978 | 0.004 |     |        |       |
| Panel PP-Statistic  | -6.956 | 0.000 | -9.075 | 0.000 |     |        |       |
| Panel ADF-Statistic | -8.132 | 0.000 | -9.986 | 0.000 |     |        |       |

#### Individual AR Coefficients Between Dimension

|                     |       |       |  |  |
|---------------------|-------|-------|--|--|
| Group rho-Statistic | 1.540 | 0.938 |  |  |
|---------------------|-------|-------|--|--|

|                     |         |       |
|---------------------|---------|-------|
| Group PP-Statistic  | -7.975  | 0.000 |
| Group ADF-Statistic | -10.122 | 0.000 |

The results show that among the seven statistics majority of the statistics reject the null hypothesis of no cointegration in all the four models at 5% level of significance. Consequently, it can be established that all the variables are cointegrated. The finding of Koa (1999) test also shows cointegration in all the four models at 1% level of significance. Hence, both tests confirm the existence of a long-run cointegration among selected variables.

### 5.1. Dynamic Ordinary Least Square (DOLS)

Cointegration techniques are applied to detect the presence of long run association among integrated economic variables. Many of these tests have inherently low power when applied to time series data. However, this problem can be avoided by allowing the data to vary across time and units. Once the existence of cointegration is established among the variables, the long run relationship can be estimated by using dynamic ordinary least square (DOLS) estimator. This approach is proposed by Stock and Watson in (1993), Kao and Chiang (2000), Herzog (2014) among others.

The biasness induced by endogeneity and serial correlation in conventional ordinary least square is corrected by DOLS. The problem of endogeneity is solved by including differences on the regressors, and serial correlation is corrected by including lags and leads of these differences. DOLS estimator is preferred over fully modified ordinary least square (FMOLS) estimator as its performance is better. Wagner and Hlouskova (2010) showed that the estimator of DOLS outperforms all the single equation and system estimators. Furthermore, Harris and Sollis (2003) found FMOLS less robust in the presence of outliers and also have issues in sample where the residuals have large negative moving average components. Present study allows limited degree of cross sectional dependency by introducing time specific effects. Lags and leads length are selected by Akaike information criteria (AIC). The outcomes are presented in Table 3.

**Table 3: Results of DOLS**

**Model 1: Dependent Variable is  $HDI_{it}$**

| Variable   | Coefficient | St. error | t-Stats | P-Value |
|------------|-------------|-----------|---------|---------|
| $EGI_{it}$ | 0.059***    | 0.011     | 5.248   | 0.000   |
| $PGI_{it}$ | 0.022**     | 0.009     | 2.412   | 0.016   |

|   |          |       |       |       |
|---|----------|-------|-------|-------|
| $SGI_{it}$  | 0.062*** | 0.016 | 3.890 | 0.000 |
| <b>Model 2: Dependent Variable is Income Index<math>_{it}</math></b>          |          |       |       |       |
| $EGI_{it}$  | 0.067*** | 0.014 | 4.917 | 0.000 |
| $PGI_{it}$  | 0.037*** | 0.011 | 3.395 | 0.000 |
| $SGI_{it}$  | 0.133*** | 0.019 | 7.069 | 0.000 |
| <b>Model 3: Dependent Variable is Life Expectancy Index<math>_{it}</math></b> |          |       |       |       |
| $EGI_{it}$  | 0.065*** | 0.021 | 3.168 | 0.001 |
| $PGI_{it}$  | 0.012    | 0.017 | 0.696 | 0.486 |
| $SGI_{it}$  | 0.031**  | 0.029 | 2.060 | 0.020 |
| <b>Model 4: Dependent Variable is Education<math>_{it}</math></b>             |          |       |       |       |
| $EGI_{it}$  | 0.029*   | 0.017 | 1.664 | 0.096 |
| $PGI_{it}$  | 0.030**  | 0.014 | 2.060 | 0.039 |
| $SGI_{it}$  | 0.114*** | 0.024 | 4.683 | 0.000 |

Note: The symbols \*\*\*, \*\* and \* indicate significant at 1%, 5% and 10% levels respectively.

Results of model 1 show positive and significant effect of all the three types of globalization on HDI. It shows improvement in human welfare due to the process of globalization. Economic and social globalization has stronger impact on human welfare as compared to the political globalization. Globalization increases the flow of trade, investment and capital. It brings reorganization of production procedures at national and international levels. Moreover, it also transforms trade patterns and the structure of financial markets. Consequently, more interconnected relationship has been observed at economic, financial, political and social level, which influences the human welfare. The new improved global relations generate favourable effects by creating investment and employment opportunities.

Mutual trade agreements stimulate higher production with greater efficiency as it encourages the economies to maximize the gains through specialization. Hence, it implies that goods can be produced at lower opportunity cost. Globalization has created an environment of hyper specialization (Johns et al., 2011). Benefits of free trade can be summarized in to lower prices, wider variety of consumer goods, export markets for domestic producers, economies of scale through specialization in certain commodities and greater competition. Hence, it effects the growth and income level of the countries which consequently reflects in higher human welfare.

Globalization transforms the structures of the economies but it is interesting that this transformation is beneficial for the human welfare as indicated by present study. Therefore, there is no harm in promoting and supporting the interdependent policies. Social globalization refers as easy access to information and communication. In the recent past the cost of information, communication and transportation has significantly reduced. Hence, it has expedited the process of social integration, which results in robust effect on human welfare.

Model 2 reports that all the three types of globalization increases per capita income. Economic, social and political interdependences of the countries are appeared to be beneficial in increasing per capita income. This finding provides support to the proponents of globalization. It is interesting to note that social globalization has leading effect on per capital income. Social linkages with the rest of the world promotes the culture of single unit in that acquiring information is quite easy; therefore, it has potential to effect per capita income. Furthermore, it promotes the adoption of more advanced technologies; hence, the expansion and introduction of new technologies are stimulating per capita income. Similarly, economic relations with developed and developing economies are always critical to effect growth and per capital income. The study confirms this relation and shows positive effect on per capita income. Global Political interdependence, global policies and networks are also appeared to have contributing effect on per capita income.

Model 3 indicate positive impact of economic and social globalization on life expectancy index, while political globalization is insignificant. Modern information technologies and worldwide communication through internet increase universal access to latest information and knowledge that may help to design and administer public health programs. Furthermore, the globalization of the medico-social networks facilitates communication between doctors, patients, laboratories, and other related players around the world. Therefore, it improves the performance of health sector via enhanced health surveillance across the globe. Globalization in general and economic liberalization in particular, affect healthcare through pricing and trade policies of pharmaceuticals. Economic globalization has more dominating impact on health sector as compared to the social globalization. Countries with more economic integration may have high access to better health care facilities resulting in more improvement in the status of human welfare.

This study also indicates positive impact of all the three types of globalization on education in model 4. The expansion of education and western oriented standards of learning at almost all levels is due to globalization. Social globalization has stronger impact on education. Widely available schooling is possible due to the efforts of social and political networks in the era of twentieth century. Generally, social networks have allowed a flexible and inexpensive exchange of knowledge across borders. These networks are appeared to serve as a source of innovation that has improved the diffusion of knowledge worldwide. It can lessen the productivity gap between countries by bringing the leading and lagging companies closer through providing access to knowledge. Hence, economic, political and social globalization is positively affecting education either by international funding mechanism or by facilitating mobility of individuals using diplomatic channels. Finally, it



can be concluded from the results that economic and social globalization generates dominating impact on human welfare.

## 7. SUMMARY AND CONCLUSION

Globalization is the economic, political, technological, social and cultural integration through trading, transportation, communication and migration. The process of globalization brings economies closer and more interrelated. In this context, countries are opening their borders and following the policies of liberalization. However, the benefits of globalization are not uniform across different regions. In some regions, the benefits of globalization are evident but in other regions the same results are not observed. Hence, there are more concerns regarding the influence of globalization on issues like, economic growth, health or education. The intensity and depth of globalization reveals various outcomes on development pattern. Thus, the link between globalization and socio-economic indicators has become the focus of attention among researchers and policy makers.

Present study explores the linkages between three categories of globalization and HDI. Three dimensions of HDI; income, health and education are also considered to establish their link with each category of globalization. The study followed the standard econometric procedure of panel data. Hence, as a prerequisite, stationarity has been checked. It illustrates that all the series are stationary at first difference; therefore, Pedroni (1999) cointegration test is applied. It shows cointegration among HDI and economic, political and social globalization. Once the existence of cointegration is established among variables, the long run relationship is estimated by using DOLS estimator. This technique is preferred over FMOLS since its performance is better.

Each category of globalization; economic, political and social, improves value of HDI. Beneficial effect of all the three categories of globalization is found on per capita income and education. Economic and social globalization improves health sector, particularly life expectancy. Therefore, it can be determined that positive and beneficial effects of globalization are evident in the selected panel of developed and developing countries. Global networks of economic cooperation, international political policies and political relations among countries and social integration contributes in the improvement of human welfare. Hence, embracing the process of global transformation generates betterment in health, education and income level. In general, it is desirable to become a part of global economy in order to exact the benefits of globalization.

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**Appendix –I: List of Countries**

|    |                |    |               |    |            |     |              |     |              |
|----|----------------|----|---------------|----|------------|-----|--------------|-----|--------------|
| 1  | Albania        | 27 | Costa Rica    | 53 | Iceland    | 79  | Mexico       | 105 | Serbia       |
| 2  | Algeria        | 28 | Cote          | 54 | India      | 80  | Moldova      | 106 | Sierra Leone |
| 3  | Argentina      | 29 | Croatia       | 55 | Indonesia  | 81  | Mongolia     | 107 | Singapore    |
| 4  | Armenia        | 30 | Cyprus        | 56 | Iran       | 82  | Morocco      | 108 | Slovakia     |
| 5  | Australia      | 31 | Czech         | 57 | Ireland    | 83  | Mozambique   | 109 | Slovenia     |
| 6  | Austria        | 32 | Denmark       | 58 | Israel     | 84  | Myanmar      | 110 | South Africa |
| 7  | Azerbaijan     | 33 | Dominica<br>n | 59 | Italy      | 85  | Namibia      | 111 | Spain        |
| 8  | Bahamas        | 34 | Ecuador       | 60 | Jamaica    | 86  | Nepal        | 112 | Sudan        |
| 9  | Bangladesh     | 35 | Egypt         | 61 | Japan      | 87  | Netherland   | 113 | Swaziland    |
| 10 | Belarus        | 36 | El Salvador   | 62 | Jordan     | 88  | New Zealand  | 114 | Sweden       |
| 11 | Belgium        | 37 | Estonia       | 63 | Kazakhstan | 89  | Nicaragua    | 115 | Switzerland  |
| 12 | Belize         | 38 | Ethiopia      | 64 | Kenya      | 90  | Niger        | 116 | Tajikistan   |
| 13 | Benin          | 39 | Fiji          | 65 | Korea      | 91  | Nigeria      | 117 | Tanzania     |
| 14 | Bolivia        | 40 | Finland       | 66 | Kyrgyzstan | 92  | Norway       | 118 | Thailand     |
| 15 | Botswana       | 41 | France        | 67 | Latvia     | 93  | Pakistan     | 119 | Tunisia      |
| 16 | Brazil         | 42 | Gabon         | 68 | Lebanon    | 94  | Panama       | 120 | Turkey       |
| 17 | Bulgaria       | 43 | Gambia        | 69 | Lesotho    | 95  | Papua Guinea | 121 | Uganda       |
| 18 | Burundi        | 44 | Greece        | 70 | Lithuania  | 96  | Paraguay     | 122 | UK           |
| 19 | Cambodia       | 45 | Georgia       | 71 | Luxemburg  | 97  | Peru         | 123 | Ukraine      |
| 20 | Cameroon       | 46 | Germany       | 72 | Madagascar | 98  | Philippines  | 124 | Uruguay      |
| 21 | Canada         | 47 | Ghana         | 73 | Malawi     | 99  | Poland       | 125 | Us           |
| 22 | Central Africa | 48 | Guatemala     | 74 | Malaysia   | 100 | Portugal     | 126 | Venezuela    |

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|    |          |    |          |    |            |     |         |     |          |
|----|----------|----|----------|----|------------|-----|---------|-----|----------|
| 23 | Chad     | 49 | Guyana   | 75 | Mali       | 101 | Romania | 127 | Vietnam  |
| 24 | Chile    | 50 | Haiti    | 76 | Malta      | 102 | Russian | 128 | Zambia   |
| 25 | china    | 51 | Honduras | 77 | Mauritania | 103 | Rwanda  | 129 | Zimbabwe |
| 26 | Colombia | 52 | Hungary  | 78 | Mauritius  | 104 | Senegal |     |          |

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