The Relationship between Gross Domestic Product and Human Development Index: Evidence from 11 Middle East Countries

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Abstract: This study explores the nexus between Gross Domestic Product and the Human Development Index in the case of eleven selected Middle East countries. Panel data has been utilized from the period of 1991-2017. By using fixed and random effect models, the Human Development Index is taken as a dependent variable and gross domestic product, population, unemployment and inflation as independent variables. The result supports the random-effect model. The finding shows that the Human Development Index has a negative and significant relationship between Gross Domestic Product and Inflation. With the dependent variable, the population has an insignificant relation. Moreover, unemployment has a positive relationship with the Human Development Index.

Keywords: GDP, Population, HDI, Random effect, Middle East.

1 Introduction

Development debates are not about per capita domestic product (GDP); development includes multi-national phenomena that cover different parts of society such as socially, law, economy, security and politics. The economic growth is a mechanism of read GDP linked to the institutional structure and development by adjustments and innovations. Discussion of GDP per capita for growth calculations is not adequate in the calculation of development. The problem of changes in social structure, cultural system and changes in social behaviour will be addressed, which will also becomes an integral component of economic growth. For example, Sarkar, Sadeka, and Sikdar (2012) implies that the Human Development Index is the the principal of the world. Eren, Çelik, and Kubat. (2014) argue that the HD is evidently about augmenting an individual's decision by sharing natural assets.

"The Human Development Index is a composite statistical index of per capita life expectancy, education and income metrics used to classify nations into four levels of human development (UNDP)." Human Development is probably a useful analytical tool to monitor the level of the development of a nation, as it consolidates all significant economic and social indicators that are liable for economic growth. In 1990, the Human development Index was adopted by United nations development Programme (UNDP). The Human Development Index generated to maintain that individuals and their skills should be the ultimate standard for measure a nation’s progress, not just economic growth. The human development (HDI) can also be used to discuss national
policy decision, questioning how different human development results can be accomplished by two countries with a similar amount of gross domestic product per capita (GDP per capita).

The resulting contrast can stimulate the conversation about government program priorities. In 1990, HDI formed from three indicators, such as living standards, knowledge, and a long and healthy life. Human Development Index is a geometric means of normalizing records of these three indices. These three indicators are education index, the health index, and knowledge index. The HDI utilized the logarithm of national income to reflect the decreasing significance of income with expanding GDP. Eren et al. (2014) stated that the degree of growth effected gross domestic product (GDP per capita). The development will expand the purchasing power of citizens and the development of health and education towards the end. In any case, the high development sector in the region does not fundamentally represent unbiased impartial prosperity for all individuals in the region.

The study will contribute to the understanding of different factors influencing the human development index in eleven selected Middle East Countries. This study reported that the GDP per capita growth, Inflation, and population have an impact on HDI evidence from eleven selected Middle East countries. In contrast, unemployment has positive effects on human development. This study suggests that HDI can be used to investigate the various strategy choices of countries; at that point, if two countries have about the same gross national income (GNI), it may help to determine why they generate broadly different result in human growth.

This article is formulated as follows: the second section represents to Literature review on independent variables relation with the dependent variable. The third section describes data sources, sample size, econometrics techniques, four selection represents to econometrics analysis methodology, and fifth selection show study conclusion and recommendation.

2 Literature Review

Many kinds of literature are associated with many factors of HDI with GDP per capita by employing different econometrics tools for theoretical and empirical analysis. For example, Using panel data from 1970 to 1992, Ramirez et al. (1998) analyzed the relationship between human development and per capita economic growth. The study of the findings shows that per capita economic growth and human development are closely related to per capita economic growth and contribute to raising the quality of living of human beings. In the case of developed, emerging and under developing countries, Islam (1994) studies the relationship between HDI and GDP per capita through the use of spearmen ran correlation for research. The result indicates that have inverse U-shaped relation between GDP per capita and HDI, valid for developing nations. The positive effect of human development on economic growth was concluded by Hasan (2000), Jamal, and Khan (2002). In the case of Latin America, Stewart and Ranis (2002) tested, using regression, the relationship between HD (human development) and per capita economic growth, and the result shows that human development has a weaker correlation with economic growth. Baseri and Kia (2008) argue that in order to improve the living standard of human life in a country, it is important to cultivate physical and human investment spending.

The case of fifteen states of India, Mukharjee, and Banerjee (2010) reported the relationship between education and health infrastructure. The empirical analysis result indicates that education and health infrastructure have a positive relationship with literacy and child survival rate. Also, it shows that health infrastructure had a positive relationship with the random result of health. In the case of Nigeria, Abraham et al. (2011) investigate the relationship Gross Domestic Product and Human Development Index overused time-series data from 1975-2008 by employing Error
Correction Model. The outcome implies that the relationship between economic growth and HDI is negative and significant. Ulas and Keskin (2017) address the relationship between HDI and economic growth in the case of 20-panel countries. This analysis uses Spearman's rank correlation coefficient to find out the positive relationship between HDI and economic growth by using 2010-2014 panel data.

Nawatmi et al. (2020) used panel data to investigate the association between HDI and economic development evidence from 34 provinces of Indonesia country by employing the regression approach. The result indicates the positive impact of HDI on economic growth. In contrast, Khan et al. (2019) concluded from the positive study impact of HDI on economic development.

3 Data and Methodology

In eleven selected Middle East countries, i.e. Iran, Turkey, the United Arab Emirates, Iraq, Israel, Jordan, Lebanon, Saudi Arabia, Yemen, Bahrain and Cyprus, this study aims to explore the nexus between GDP and HDI. We did not include the remaining five Middle East countries due to a lack of data availability. This study used a panel data approach from 1991-2017. The Human Development Index is taken as a dependent variable, and independent variables include GDP, population, unemployment, inflation in this study. Data from WDI and UNDP indicators were collected.

3.1 Model Specification:

$$\text{HDI} = f(GDP, POP, UE, Inf)$$ \hspace{1cm} (1)

$$\text{Population Growth} = f(Education, Employment, Health Expenditure)$$ \hspace{1cm} (2)

$$\text{POPG} = f(\text{Edu, Emp, HE})$$ \hspace{1cm} (3)

3.2 Econometrics Model:

$$\text{HDI} = \beta_0 + \beta_1 GDP + \beta_2 POP + \beta_3 UE + \beta_4 Inf + \varepsilon$$ \hspace{1cm} (5)

$$\text{HDI}_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 POP_{it} + \beta_3 UE_{it} + \beta_4 Inf_{it} + \varepsilon_{it}$$ \hspace{1cm} (6)

In this equation, HDI is the Human Development Index, GDP is the Gross Domestic Product, POP is the population, and the unemployment rate is the UE. Inf represents the rate of inflation, i highlight the country, and t display the time.

For this study, we used panel data of the Middle East eleven countries. In this research, we were using many techniques, such as Ordinary Least Square, second fixed effect model (FEM), and the 3rd Random effect model (REM). In this empirical analysis, we used several steps. First, we used the regression model. Second, we used the fixed-effect model; third, we used the Random effect model after what the researchers utilize the Hausman test for selection between FEM or RFM.

### Variables Descriptive

| Variables          | Sign | Details                                                                 |
|--------------------|------|-------------------------------------------------------------------------|
| Dependent variable |      |                                                                         |
| Human Development  | LnHDI|                                                                         |
| Index              |      | HDI=\frac{(Income \text{ Index} + Life \text{ expectancy index} + Education \text{ Index})}{3} |
| Independent variables |    | It refers to the natural log of Inflation.                             |
Growth Domestic Product

The broadest quantitative measure of nations' overall economic activities is called GDP, and it signifies the monetary values of all goods and services which are formed within a country during a specific period say one year. It refers to the natural log of GDP.

Population

The overall number of inhabitants in a country or area is known as the population. It refers to the natural log of the people.

Unemployment

It refers to the unavailability of a job or work of a willing person. It refers to the natural log of unemployment.

Inflation

Inflation is primarily an increase in price. It is the situation of the continued rise in the general price level in the economy. It refers to the natural log of Inflation.

4 Empirical Analysis Result & Discussion

4.1 Descriptive Statistics

Table 1: Descriptive Statistics

| Variable | Obs | Mean  | Std.Dev. | Min   | Max   |
|----------|-----|-------|----------|-------|-------|
| LnHDI    | 298 | -0.332| 0.181    | -0.909| -0.102|
| LnGDP    | 298 | 0.972 | 1.076    | -4.137| 3.917 |
| LnPOP    | 298 | 4.142 | 0.133    | 3.828 | 4.456 |
| LnUE     | 298 | 1.852 | 0.782    | -0.18 | 2.981 |
| LnINF    | 298 | 1.972 | 1.413    | -4.203| 5.983 |

This table sheds light on the results of the Human Development Index (HDI), Gross Domestic Product (GDP), Population (POP), Inflation (Inf) descriptive statistics for eleven countries in the Middle East for the period 1991-2017. Descriptive statistics contains observation, mean, stander deviation, Minimum, and Maximum.

The descriptive statistics table shows that LnHDI had the lowest average (M=-.332) from GDP (M=.972). LnGDP had the highest stander deviation (SD=1.076) from LnHDI (SD=.181). On the other hand, the population had the highest average (M= 7.981) from LnHDI (M=0.726), and the stander deviation of the population (SD=4.142) is also more significant than LnHDI (SD=.133). Thus, it concluded that GDP growth and population had more significant variation data than HDI.

Table 2: Correlation Matrix

| Variables | LnHDI | LnGDP | LnPOP | LnUE | LnINF |
|-----------|-------|-------|-------|------|-------|
| LnHDI     | 1.000 |       |       |      |       |
| LnGDP     | 0.036 | 1.000 |       |      |       |
| LnPOP     | 0.789 | 0.046 | 1.000 |      |       |
| LnUE      | -0.333| 0.217 | -0.534| 1.000|       |
| LnINF     | -0.488| 0.133 | -0.314| 0.250| 1.000 |

The correlation matrix between the variables used in this analysis is reported in Table 2. The coefficient of correlation is a mathematical measure used to analyze the relationship between data sets. When two variables are correlated, it shows that they change together; positive correlation entails that the high value of correlation is associated with others. While negative correlation describes the negative relationship among variables, it ranges between +1 to -1 and represents the strength and nature of the association.

In Table 2, there is a positive correlation between HDI, GDP, population, unemployment, and Inflation. This table shows a significant relationship between LnPOP and LnHDI. However, the other variables have low correlation among each other, which indicates that there is no multicollinearity problem.
The relationship between HDI, population, unemployment, and inflation using ordinary least square regression (OLS) is explained in Table 3. The results indicate that there exists a positive association with population and HDI.

### 4.2 FIX Effect Model

The empirical results were reported in Table 4 using the fixed-effect model, and the result shows that GDP has a negative and significant relationship with the HDI. The population has a favorable but significant relationship with HDI because if the population increases, the population increases at the rate at which the population increases than the total HD (Human Development). The other factor that influences the human development index is the unemployment rate, which has positive and substantial linkage with the human development index. If the unemployment rate is lower in the country, than the quality of human development will increases. The smaller number of unemployed people, the more development in the country and poverty level also will be lower.

Inflation has an adverse and significant relationship with the Human Development Index in this result. The result indicates that when Inflation is higher in the countries will leads to less social development in these countries. People will face multiple problems when inflation increase. It will decrease the purchasing power of the consumer because the price is higher in the supply side, and the risk of poverty prevails in the country.

### 4.3 Random Effect:

The empirical results were reported in Table 5 using the random-effect model, and the result shows that GDP has a negative and significant relationship with the HDI. The population has a favorable but significant relationship with HDI because if the population increases, the population increases at the rate at which the population increases than the total HD (Human Development). The other factor that influences the human development index is the unemployment rate, which has positive and substantial linkage with the human development index. If the unemployment rate is lower in the country, than the quality of human development will increases. The smaller number of unemployed people, the more development in the country and poverty level also will be lower.
The random effects model is implemented in the empirical panel analysis of panel data when no fixed effects in econometrics are claimed. A special case of the fixed-effects model is the REM (Random-effects model). The random notion of impact is that unnoticed human variability is unrelated to independent variables.

By using a random-effects model, Table 5 elaborates on the empirical research result, and empirical findings show that GDP and inflation rates have a negative and important relationship with HDI. On the other hand, there is a positive and significant correlation between the unemployment rate and human growth, and the population has an insignificant relationship with human development. Constant value is negative and negligible in this table, which has been negatively and substantially associated with human growth by gross domestic product. GDP is the sum of all the final goods and services that an economy produces. When the GDP of an economy is higher, and if an economy's GDP is greater than the superiority of human growth, the economy of the nation is more strong.

The population has an inconsequential affiliation with human development, the more populous a country, the less human development, the poverty level is high, and the risk of illiteracy, health-related issues and unavailability of jobs are prevailing.

The unemployment factor also hits human development in the country because if the joblessness exists in the countryside, social advancement will also severely affect in that state. The more working people, the more improvement will be.

Inflation has a negative and important relationship to human development, because if goods and services costs are high in the market, lower economic growth can lead to lower consumer acquisition capacity.

Table 6: Hausman (1978) specification test result.

| Coef.                  |       |
|------------------------|-------|
| Chi-square test value  | -2.463|
| P-value                | 1     |

The table above shows the effects of the Hausman test, the goal being to evaluate the model with a fixed effect using the random effect model. The results of the Hausman test indicate a major effect. The result shows that this study is more robust if the FEM than the REM is used.

5 Conclusion and Recommendation

This study explores the effect of the Human Development Index (HDI) on GDP, population, unemployment and inflation. The study aims at eleven selected Middle East countries, which include Iran, Iraq, Israel, Yemen, Bahrain, Cyprus, Jordan, Lebanon, Saudi Arabia, Turkey, the United Arab Emirates. Moreover on behalf of the other five nations, restricted data concerns were not included in this report. Due to the completeness of the data from eleven nations, this analysis used panel data from 1991-2017. HDI was viewed as a dependent variable and was independent of the other four variables. The empirical outcome of the Random Effect Model implies that GDP and the inflation rate have a negative and important relationship with the HDI.
In contrast, the unemployment rate has a positive and substantial linkage with human development, and the population has an insignificant relationship with human development. Gross domestic product has negatively and significantly correlated with human development. GDP is the sum of all final goods and services produced in an economy. The nation's economy is more powerful when the GDP of an economy is higher, and if the GDP of an economy is better than the superiority of human development is high.

5.1 Recommendations

More the countries add to their GDP more the need to spend on Human Development, as a negative relationship would suggest more resources are being used for economic growth and lesser funds are available to promote human development. Inflation rates in the region and in any country, facing higher inflation than average, need to be addressed to mitigate its impact on human development. Raising employment policies would lead to increasing the purchasing power of masses around the region and it would trigger human development in the next round.

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