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Najia, Noura; Taher, Hanadi; Elkader, Ghassan Abed

## Article

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International Journal of Energy Economics and Policy

## Provided in Cooperation with:

International Journal of Energy Economics and Policy (IJEEP)

*Reference:* Najia, Noura/Taher, Hanadi et. al. (2025). The effect of environmental deterioration and socio-cultural factors on economic sustainability in asia pacific selected countries. In: International Journal of Energy Economics and Policy 15 (1), S. 8 - 14.  
<https://econjournals.com/index.php/ijEEP/article/download/17472/8404/40771>.  
doi:10.32479/ijEEP.17472.

This Version is available at:

<http://hdl.handle.net/11159/703139>

## Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics  
Düsternbrooker Weg 120  
24105 Kiel (Germany)  
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)  
<https://www.zbw.eu/>

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# The Effect of Environmental Deterioration and Socio-cultural Factors on Economic Sustainability in Asia Pacific Selected Countries

Noura Najia<sup>1\*</sup>, Hanadi Taher<sup>2</sup>, Ghassan Abed Elkader<sup>2</sup>

<sup>1</sup>PhD Candidate in Economics, Beirut Arab University, Lebanon, <sup>2</sup>Beirut Arab University, Lebanon. \*Email: [noura.najia@hotmail.com](mailto:noura.najia@hotmail.com)

Received: 24 August 2024

Accepted: 12 November 2024

DOI: <https://doi.org/10.32479/ijeeep.17472>

## ABSTRACT

Many studies and scholars focus on the impact of climate change and pollution on economic green growth, linked to cultural variables. The discussed socio-cultural factors are measured by World Values Surveys, and environmental deterioration presented as different types of pollution are both independently essential for economic sustainability. The article refers to the socio-cultural index and sustainability. Environmental deterioration index as calculated by principal component analysis; Socio-cultural index formed by culture dimensions most of them mentioned by Hofstede (1980) such as masculinity, individualism and power distance; also, social development, and life expectancy and education level. Based on Environmental Kuznets Curve, there is a strong linkage among environmental degradation and income level. This paper applies Panel data by using generalized least square estimation; due to the existence of heteroskedasticity and serial correlation validate by Durbin-Watson test and Breusch-Pagan test respectively. The data was taken from World Value Surveys and European Value Surveys for Hofstede dimensions; World Bank such as GDP per capita, FDI, life expectancy at birth, tertiary school enrollment, and land pollution; and BP statistics of world energy for CO<sub>2</sub> over years 2000–2022. The results show negative causal relationship between socio-cultural and economic sustainability and, a positive impact of environmental deterioration on economic.

**Keywords:** Economic Sustainability, Social Factors, Cultural Factors, Environmental Deterioration, Kuznets Curve, Asia Pacific

**JEL Classifications:** A130, C180, Q530

## 1. INTRODUCTION

Environmental deterioration (defined as the climate change and pollution phenomena) combined with the cultural dimension are considered the essential variables in economic development according to many scholars. For instance, neoclassical theory, like North (1990) focused on the culture and the norms of which it is formed interact in a complex direction with the economic system known as the connection of human institutions and encouragement that produce the two essential factors: the economic growth rate and the distribution of wealth and income, leading to the economic revenues (Petrakis, 2014). Moreover, Kafka's mentioned that the culture of societies impacts the performance of economic policy,

since a country has to confirm the economic policy in order to be more efficient (Kafka, 2020).

In a parallel dimension, culture is determined in different way to rise the performance and sustainability (Adebayo et al., 2020; Carta et al., 2020). In accordance with all the mentioned above, this study will determine the impact of socio-cultural on economic sustainability that refers to the overall practices supporting long-term economic growth without harmful impact on environmental aspects of the society ((United Nations 2008; 2024, HDR 2021–2022, Foladori, 2005). Hofsted tested country's cultures were tested in employing four dimensions (such as power distance, uncertainty avoidance, individualism, and masculinity) has two ranges: high or low power distance, weak or strong uncertainty

avoidance, individualist or collectivist, and masculine or feminine (Hofstede, 1980).

In order to reemphasize the connection between environment and economic growth, Environmental Kuznets Curve (EKC) focused on the environmental degradation rises to a certain level with a high level of revenue and then the environmental degradation decreases (U-Shaped). Culture and norms help to achieve green policies in order to improve economic sustainability. For example, the utilization of fossil fuels, which started with the Industrial Revolution, has tend to environmental deterioration and then universal warming. For that, renewable energy that don't lead to the environmental pollution, are starting to be shown as a solution to environmental worries and energy safety. The essential reason of global warming is the gas emissions. Around two-thirds of greenhouse gasses (GHGs) are resulted by the sector of energy (IEA, 2017). While, CO<sub>2</sub> emissions formed about 81% of total GHGs in developing countries, the shortage of capital lead to several macroeconomic problems. In order to fix these issues, nations demand external loans or FDI. Therefore, emerging nations may become pollution refuges, and so, FDI may be a variable that improves environmental deterioration (Pata, 2019).

As for the chosen case study of this article, the five chosen nations for the study were Thailand, Malaysia, Singapore, Indonesia, and Philippines, who enjoyed the ASEAN established in 1967 to encourage political and economic collaboration and national constancy as a station for international investment, in addition to promote socio- economic development socio-cultural growth between the ASEAN countries. There are different beginnings performed to promote these objectives such as the elimination of investment and trade barriers to engage foreign direct investment (FDI) to the ASEAN country via several agreements (Ahmed et al., 2015). The air pollution (CO<sub>2</sub> emissions) and land pollution (forestry, agriculture) showed a positive significant in ASEAN regions which could impact the ASEAN economic sustainability.

## 2. LITERATURE REVIEW AND HYPOTHESIS

From a theoretical background, the culture theories as presented by Hofstede (1980) endeavor to create a detailed set of moral measurements of culture such as uncertainty avoidance, and masculinity. In fact, the contribution of culture dimensions to economic sustainability led to the result that the main cause to push human behavior is socio-cultural factors. In addition, Solow (1957) emphasized that labor, capital, technology, and human capital are the essential determinants for economic growth which are related to cultural background that specifies a society.

If we visit the classic writings of Hardin's (1968), we can find that the model of the "tragedy of the commons" defined which each nation is similar to a single actor and countries cannot legally oblige other countries to restrict carbon emissions. Within this perspective, the risk is that if some countries implement these limits while others do not, the latter will have a competitive advantage in terms of economic growth, as companies may relocate to countries without such limitations, leading to "leakage" of firms and production. Based on the previous approach, there is

a tendency to exacerbate the issue of carbon emissions and climate transformation, making it difficult to reach a global consensus on how to effectively address the problem.

In the empirical study, the relationship between socio-cultural factors, environmental deterioration factors, and economic growth showed a variation of results; such a theoretical background is derived from Hofstede dimensions' theory on economic growth (Hofstede, 1980) arguing that socio-cultural affect positively economic growth. Therefore, previous studies presented a negative impact of culture on economic growth (Butzer et al., 2013; Kafka and Kostis, 2021). Other scholars showed a positive relationship between culture and economic growth such as Gorodnichenko and Roland (2011) Korkmaz and Kulunk (2016) and Popa (2012). This is on one hand. On the other hand, other scholars found that there is no impact of culture on economic growth (Tsegaye, 2019). Nevertheless, another empirical development has emerged to clarify the impact of culture and economic growth on green economy with Lee et al. (2022) who tested the impact of culture on green economy during 1995-2014 across 122 countries. Their findings encouraged the financial development to reach growth of green economy through avoiding the negative effect of culture.

According to the EKC theory, several studies showed the strong affiliation between environmental deterioration and economic growth (Balin, 2021; Sharif et al., 2020; Al-Mulali et al., 2015; Mughal et al., 2022). Other studies found causal relationship between carbon emissions and economic growth (You et al., 2022; J. Song et al., 2018; Zhao et al., 2017; Chiu, 2017). More empirical studies managed to present the relationship between environmental deterioration and economic growth such as Mahalik et al. (2022) who tested the correlation among CO<sub>2</sub> emissions, energy consumption, mortality, life expectancy, and GDP data series from 1975 to 2015. The result returned a strong and positive linkage among CO<sub>2</sub> emissions and energy consumption, but a low relationship between infant death rates and expectation of life. Another study conducted by Ali et al. (2022) verified the relationship between FDI, urbanization, CO<sub>2</sub> emissions, green innovation in BRICS and they concluded that economic growth improves CO<sub>2</sub> emissions. However, Magazzino et al. (2022) investigated the relationship between CO<sub>2</sub> emissions, renewable energy use, and GDP over the period 1990-2018. They conclude that renewable energy use decrease CO<sub>2</sub> emissions without reduce economic development. Therefore, Haider et al. (2020) examined the effect agriculture land use and economic growth on nitrous oxide releases over the period 1980-2012 for developed and developing countries. The results found that economic growth and N<sub>2</sub>O emissions are co-integrated, agriculture land use affect positively N<sub>2</sub>O emissions. In addition, Zhang et al. (2021) investigated the relationship between total wastewater discharge, population, urbanization, economic growth, technological progress, industry, fixed assets investment, trade openness, and wastewater treatment. The results showed that economic growth and water environment burden presented a good trend (from feeble to robust dissociating).

Regarding the case study of this article, it is important to mention that the Asia Pacific region has not heavily witnessed studies

about the linkage between socio-culture factors, environmental deterioration, and economic growth. ASEAN countries are characterized by several cultures and societies that can be a source of cross-cultural conflict and miscommunication. Hence, investors have to recognize and to make use of the socio-cultural variation of people from different countries to make profits (Paul, 2009). Additionally, the level of education mainly studied several languages lead to rise the communication between nations and reduce costs which encourage FDI and improve economic growth in ASEAN countries (Ismail, 2010). Investing in socio-cultural factors seems essential for the social and economic advancement for a region such as ASEAN based on Apriyantopo and Aprianingsih works (2020); both authors studied the relationship between Information Communication and Technology (ICT) adoption, socio-cultural factor and economic growth in Asian countries where the economic growth showed that it is a strong factor connected to the cultural dimensions in order to test ICT adoption fluctuations. In another study, Wibowo (2019) examined the relationship between income per capita, life expectancy, infant mortality, population growth rate, and working-age population in ASEAN countries by using panel data and Ordinary Least Square during the period 1985-2016. The results showed a strong impact of working-age population, life expectancy, infant mortality, and population growth on GDP per capita in ASEAN nations.

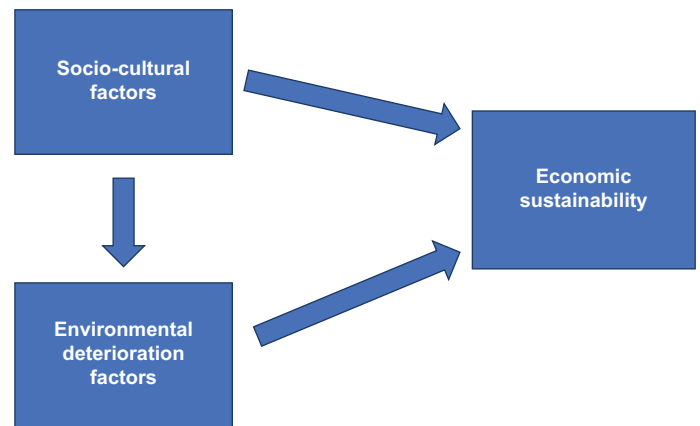
Moreover, ASEAN countries face several stable and developing threats in increasing inequality, unorganized urban population development, demographic variations, as well as environmental degradation and climate change. There is a positive effect of economic growth on energy consumption on environmental deterioration during the period 1991-2013 in ASEAN countries (Jamel and Derbali, 2016). In addition, Burki and Tahir (2022) investigated the influence of income per capita, energy consumption, trade openness, and financial growth on environmental deterioration over the passé 2001–2020 in ASEAN countries. They concluded that financial development, trade openness, and energy consumption impact positively environmental deterioration. Moreover, Mughal et al. study (2022) results showed that during the period 1990–2019 there was a causal relationship between economic growth and environment pollution; and a bidirectional connection among economic growth and energy consumption.

Based on the empirical studies and the theoretical background of Hofstede and EKC theory curve, the relationship between socio-culture factors, environmental degradation factors, and economic sustainability differs in findings among economies. In the same manner, literature review on ASEAN region presented diversity but didn't examine all variables together.

This study endeavors to examine the impact of socio-culture factors and environmental deterioration on economic sustainability of Asia Pacific regions (UNESCAP, 2024). Thence, a conceptual framework is showed in Figure 1, and the hypothesis are formulated as follows:

- H<sub>1</sub>: Socio- cultural factors influenced economic sustainability and environmental deterioration  
H<sub>2</sub>: Environmental deterioration factors improve economic sustainability

Figure 1: Conceptual model



### 3. METHODS

According to Hofstede (1980), the explanatory variable of socio-cultural index such as power distance and uncertainty avoidance in addition to other. Moreover, the socio-cultural index contains economic development factors like life expectancy and education level. In addition, socio-cultural index presents socio development factors such as thrift, and trust.

Based on EKC hypothesis, the environmental deterioration index presents air pollution indicates by carbon neutrality (CO<sub>2</sub> emissions), and land pollution presents by different economic sectors (% of GDP).

The factors take value between −4 and +4. This study applied the methodology of Poudel et al. (2012) to form the socio-cultural index and environmental deterioration index for ASEAN countries by using principal component analysis (PCA). This methodology enlarges the variance more than reduces the least square distance. It transfers the essential set of factors into a smaller set of uncorrelated factors including all the information approximately. The change of the original factors into the index is mentioned as follow:

$$SC = a_1 \text{Power Distance} + a_2 \text{Uncertainty Avoidance} + a_3 \text{Masculinity} + a_4 \text{Individualism} + a_5 \text{Thrift} + a_6 \text{Trust} + a_7 \text{Life expectance at birth} + a_8 \text{Education level} = \sum_{i=1}^p a_i x_i \quad (1)$$

$$ED = a_1 \text{CO}_2 + a_2 \text{Land Pollution} = \sum_{i=1}^p a_i x_i \quad (2)$$

The equation 1 and equation 2 examines the vector of weights ( $a_{11}, a_{12}, a_{1p}$ ) which enlarges the information included in the index, and the related difference of  $SC_i$  and  $EN_i$  which is presented by  $\lambda$  and  $\lambda_i$  respectively. The study distinguished the number of variables to form socio-cultural and environmental deterioration utilizing an Eigen value criterion. When the number of variables is distinguished, weighted factors applied in the regression based on the weight displayed in the variable pattern. The socio-cultural for the countries as follow:  $SC_i = \sum w_i x_{ij}$ , where  $w_j$  is the score



of the component and  $x_{ij}$  is the value of factors for each country. Also, the environmental deterioration for the countries as follow:  $ED_i = \sum w_j x_{ij}$  where  $w_j$  is the score of the component and  $x_{ij}$  is the values of factors for each country.

According to Kayalvizhi and Thenmozhi (2018) who examined the relationship between culture, innovation and foreign direct investment. Adding to the above, an econometric model of the impact of socio-cultural index and environmental deterioration index on economic sustainability will be estimated for a panel of Asia Pacific countries (UNESCAP, 2024) and from 2000 to 2022. The below indicators of socio-cultural (SC), environmental deterioration (ED) relevant from the common indicators of several previous studies of the culture and economic variables.

The model is specified in Equation 3, GDP per capita, socio-cultural, environmental deterioration, and foreign direct investment. Economic sustainability presented as GDP per capita is transformed into logarithm form for simple calculation.

$$\text{LnGDP} = f(\text{SC}, \text{ED}) \quad (3)$$

Levin et al. (2002) have been developed panel unit root tests have been developed by Levin. In addition, fixed effect models have suggested by Bhargava et al. (1982).

According to Panel data, several tests should be applied in order to have the finest model. First, pooled least square used, fixed and random effect in order to test the impact of socio-cultural factors and environmental deterioration factors on economic sustainability. Pesaran (2004) tested the cross-section dependence (CD) to determine if it exists any correlation between the cross sections. Therefore, Pesaran (2015) tested the low cross-sectional dependence by supposing that the errors are weakly cross-sectional dependent as null hypothesis. Breusch and Pagan (1979) test developed in order to examine the existence of heteroskedasticity.

First, pooled least square applies in equation 4 as follow:

$$\text{LnGDP}_{it} = \beta_0 + \beta_1 \text{SC}_{it} + \beta_2 \text{ED}_{it} + \beta_3 \text{FDI}_{it} + \varepsilon_{it} \quad (4)$$

After applying pooled least square, fixed effect applies in equation 5 and then a test used to compare the best model between pooled least square and fixed effect model.

$$\text{LnGDP}_{it} = \beta_0 + \beta_1 \text{SC}_{it} + \beta_2 \text{ED}_{it} + \beta_3 \text{FDI}_{it} + \varepsilon_{it} \quad (5)$$

Therefore, random effect applies in equation 6 and Hausman test uses to determine if this study affects by fixed effect or random effect.

$$\text{LnGDP}_{it} = \beta_0 + \beta_1 \text{SC}_{it} + \beta_2 \text{ED}_{it} + \beta_3 \text{FDI}_{it} + \varepsilon_{it} \quad (6)$$

In the results of heteroskedasticity, the variables are divided by the standard deviation ( $\delta_i$ ) and mentioned in the equation (7) as follows:

$$\frac{\text{LnGDP}_{it}}{\delta_i} = \frac{\beta_0}{\delta_i} + \frac{\beta_1 + \text{SC}_{it}}{\delta_i} + \frac{\beta_2 + \text{ED}_{it}}{\delta_i} + \frac{\beta_3 + \text{FDI}_{it}}{\delta_i} + \frac{\varepsilon_{it}}{\delta_i} \quad (7)$$

Due to the presence of heteroskedasticity, this study applies generalized least square (GLS) model that is effective and homoscedastic. Therefore, equation (8) presents GLS model with a simple form that is effective and homoscedasticity, it is used in this study for the econometric analysis

$$\text{LnGDP}_{it}^* = \beta_0^* + \beta_1 \text{SC}_{it}^* + \beta_2 \text{ED}_{it}^* + \text{FDI}_{it}^* + \mu_{it}^* \quad (8)$$

GDP per capita presents economic sustainability, SC defines the socio-cultural factors, ED indicates environmental deterioration factors, and FDI represents foreign direct investment. country is mentioned by  $i$ , and  $t$  presents the years.

Finally, the residual diagnostic tests apply to this study such as normality test (Jarque and Bera, 1980) and Pesaran (2004) test to confirm the Panel GLS model.

## 4. RESULTS AND DISCUSSION

Descriptive statistics define and organize features of variables. Table 1 identifies the summary of descriptive statistics for all the variables of this study. GDP per capita has a mean value of 4029 with a maximum value of 11993 and a minimum value of 394.6. The mean value of socio-cultural index is 0 with a maximum value of 3.90 and a minimum value of -2.45. The mean value of environmental deterioration index is 0 with a maximum value of 2.36 and a minimum value of -3.23. Then, the mean value of FDI 2.738 with a maximum value of 9.663 and a minimum value of -2.757.

The impact of socio-cultural index and environmental index presents as independent variables on economic sustainability presents as dependent variable was demonstrating by correlation analysis. Table 2 presents the correlation analysis. The results display that FDI is positively correlated with GDP per capita, FDI and environmental degradation are negatively correlated with socio-cultural. In addition, this study checked the multicollinearity of variables by variance inflation factors (VIF) and it results that all values less than 5 which means that it doesn't exists multicollinearity in this study.

This study applies Panel least square estimation in order to examine the relationship between socio-cultural index and environmental deterioration index on economic sustainability. First, pooled least square was conducted and showed a negative impact of socio-cultural index on economic sustainability, while a positive impact of environmental deterioration and FDI on economic sustainability. Second, fixed effect model examined these relationships and found that there is no relationship between socio-cultural index, FDI and economic sustainability, while it exists a positive impact of environmental deterioration on economic sustainability. Third, random effect uses and show that there is no relationship between socio-cultural index and economic sustainability and there is a positive impact of environmental deterioration and FDI on

**Table 1: Descriptive statistics**

| Var | Mean   | Median  | Standard deviation | Maximum | Minimum | Observations |
|-----|--------|---------|--------------------|---------|---------|--------------|
| GDP | 4029.0 | 3343.8  | 2944.0827          | 11993.2 | 394.6   | 115          |
| SC  | 0      | -0.1910 | 1.4376             | 3.9084  | -2.4510 | 115          |
| ED  | 0      | 0.2579  | 1.0650             | 2.3636  | -3.2370 | 115          |
| FDI | 2.738  | 2.713   | 1.8054             | 9.663   | -2.757  | 115          |

**Table 2: Correlation statistics**

| Var | GDP    | SC        | ED     | FDI   |
|-----|--------|-----------|--------|-------|
| GDP | 1.000  |           |        |       |
| SC  | -0.205 | 1.000     |        |       |
| ED  | 0.579  | -0.106*   | 1.000  |       |
| FDI | 0.068* | -0.019*** | -0.235 | 1.000 |

Source: Own calculation. Note, \*\*\*, \*\*, \* indicate the significance level at 1%, 5%, and 10% respectively

economic sustainability. Hausman test have a  $P < 2.2e-16$  which indicates that fixed effect should be applied. Pesaran CD test show the existence of serial correlation and Durbin Watson test found the existence of heteroskedasticity. In order to solve these problems, generalized least square estimation conducts.

Table 3 presents the outcomes of Panel least square estimations. The results of panel pooled LS based on equation (4) is not applicable. Therefore, this study conducts the panel fixed properties based on equation (5) and panel random effect based on equation (6). Hausman test determined that FE estimation is not applicable in this study. Moreover, the results showed the existence of heteroscedasticity and serial correlation.

The estimated findings (Table 4) showed that the coefficient of socio-cultural factors is negatively significant at the 10% level, denoting that socio-cultural index negatively affect GDP per capita. Any decrease in socio-cultural is likely to improve the economic performance of the countries. Ciommi et al. (2021) found that social capital had negative impact on economic growth taken into consideration the variables included in the index (life expectancy, population and persons with tertiary level in education). In such countries, the disadvantages of culture values may exceed their advantages, for that it has a adverse impact on growth (Liu et al., 2020).

Therefore, the coefficient of environmental deterioration is positively significant at 1% level, indicating that environmental deterioration index positively affects GDP per capita. Any increase in environmental deterioration will encourage the economic growth. An increase in the country's economy will help the pollution to develop (Bakhsh et al., 2017).

In addition, the coefficient of FDI is positively significant at 1% level, noting that foreign direct investment positively affects GDP per capita. Any decrease in foreign direct investment will improve the economic growth. In such cases, FDI can be affect economic growth positively or negatively (Fan and Hao, 2020).

According to the outcomes, the sustainability, socio-cultural factors and socio-environmental factors have a causal relationship. Based on Hofstede dimensions, Butzer et al. (2013), Kafka and

**Table 3: Panel LS outcomes**

| Pooled least squares (OLS) outcomes |             |         |             |
|-------------------------------------|-------------|---------|-------------|
| Variable                            | Coefficient | t-stat  | P-value     |
| SC                                  | -0.0615     | -1.899  | 0.0601*     |
| ED                                  | 0.6163      | 13.705  | <2e-16***   |
| FDI                                 | 0.1016      | 3.853   | 0.0001***   |
| C                                   | 7.7344      | 90.276  | <2e-16***   |
| Panel fixed effects (FE) outcomes   |             |         |             |
| Variable                            | Coefficient | t-stat  | P-value     |
| SC                                  | 0.0019      | 0.1012  | 0.9196      |
| ED                                  | 0.6719      | 17.1582 | <2e-16***   |
| FDI                                 | 0.0272      | 1.2855  | 0.2014      |
| FE test outcomes                    | Statistic   | d.f.    | P-value     |
|                                     | 53.22       | 4       | <2.2e-16    |
| Panel random effects (RE) outcomes  |             |         |             |
| Variable                            | Coefficient | t-stat  | P-value     |
| SC                                  | -0.0114     | -0.5000 | 0.6170      |
| ED                                  | 0.6427      | 15.7369 | <2e-16***   |
| FDI                                 | 0.0536      | 2.3589  | 0.0183*     |
| C                                   | 7.8659      | 82.0377 | <2.2e-16*** |
| Hausman test                        | Statistic   | d.f.    | P-value     |
| Hausman test                        | 171.63      | 3       | <2.2e-16    |
| Heteroskedasticity test             | Value       | d.f.    | P-value     |
| Likelihood ratio                    | 15.326      | 3       | 0.00155     |

Note: \*\*\*P<0.01, \*\*P<0.05, \*P<0.1

**Table 4: Panel GLS estimation results**

| Var                       | Coefficient | t-stat  | P-value   |
|---------------------------|-------------|---------|-----------|
| SC                        | -0.0615     | -1.899  | 0.0601*   |
| ED                        | 0.6163      | 13.705  | <2e-16*** |
| FDI                       | 0.1016      | 3.853   | 0.0001*** |
| C                         | 7.7344      | 90.276  | <2e-16*** |
| Residual diagnostic check | Value       | P-value |           |
| Pesaran CD                | 1.9392      | 0.7422  |           |
| Jarque and Bera           | 0.9830      | 0.1553  |           |

Note: \*\*\*P<0.01, \*\*P<0.05, \*P<0.1

Kostis (2021), Mahalik et al. (2022), Haider et al. (2020), Zhang et al. (2021), Lee et al. (2022).

Therefore, the negative impact of socio-cultural factors on economic growth in ASEAN countries is confirmed by the findings of such studies (Apriyantopo and Aprianingsih, 2020; Wibowo, 2019). For that, the study accepts H1. In addition, the study shows a positive impact of environmental degradation on economic growth in ASEAN countries which is founded by Azzam (2016), Jamel and Derbali (2016), Burki and Tahir (2022), and Mughal et al. (2022). The study accepts H2.

As it was mentioned above, the literature review tried to build a linkage between socio-cultural factors, environmental degradation factors and economic sustainability presented variations. The

findings of this study showed clearly the existence of such significant relationship between the variables. Moreover, the acquired results confirm the Hofstede theory that culture has a significant relationship with economic growth (Hofstede, 1980). In addition, the results of the study reaffirm what was suggested by the “Environmental Kuznets Curve” (EKC) theory that environmental decline impact positively on economic growth (Balin, 2021; Sharif et al., 2020; Al-Mulali et al., 2015; Mughal et al., 2022).

As a sum, the findings of the study uphold that socio-cultural factors and environmental degradation factors have an impact on economic growth which also confirms previous studies (Mahalik et al., 2022, Ali et al., 2022, Burki and Tahir, 2022, Mughal et al., 2022). In addition, this article reconfirm on the study of Mughal et al. (2022) that found a causal connection between economic growth and environment pollution; and a bidirectional relationship among economic growth and energy consumption in ASEAN countries. Also, the above results validate the positive relationship between income per capita, energy consumption, trade openness, financial development, end environmental degradation in ASEAN countries discussed by Burki and Tahir (2022).

## 5. CONCLUSION

The study observed the impact of socio-cultural and environmental deterioration on economic of Asia Pacific countries for the period between 2000 and 2022. The econometric test begins by checking the serial correlation, Pesaran’s CD test is applied first to detect the serial correlation between the panel data series and showed it exists a correlation between the cross-sections. After conducting pooled least square, fixed model, random model, and Hausman test; Durbin Watson test is applied to check the heteroskedasticity and it showed the existence of heteroscedasticity. In order to solve the existence of the two assumptions such as serial correlation and heteroscedasticity, Panel Generalized Least Square (GLS) was applied. By applying Panel GLS estimation, the study showed a negative impact of socio-cultural factors on economic sustainability; and a positive impact of environmental degradation on economic sustainability, which confirms the literature. Moreover, for ASEAN countries, economic sustainability is more significantly affected by environmental deterioration factors than by socio-cultural factors.

Based on the findings of this study, renewable energy consumptions are essential to achieve the economic sustainability of ASEAN countries. Despite the positive impact of environmental deterioration factors on economic growth as a factor of economic output, Asia Pacific regions should improve renewable energy consumption mainly related to the air pollution (CO<sub>2</sub> emissions) and land pollution (forestry) for a sustainable economic growth. In addition, the negative impact of socio-cultural factors on economic sustainability gives the attention for the importance of information of communication and technology, which is a vital factor in the culture dimensions to improve the economic growth. Also, the level of education and life expectancy at birth have a high significant impact on the sustainability of Asia Pacific regions. Wherefore, the study recommends that ASEAN countries should encourage to have a high level of education in information of communication and technology in order to improve the culture

dimensions and foreign direct investment which reflects positively to the economic sustainability.

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