DIGITALES ARCHIV

Sri Fadilah; Lestari, Rini; Mohd Hadafi Sahdan et al.

Article

The impact of renewable energy consumption on the economic growth of the ASEAN countries

This Version is available at:
http://hdl.handle.net/11159/8071

Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Mitglied der
Leibniz-Gemeinschaft

The Impact of Renewable Energy Consumption on the Economic Growth of the ASEAN Countries

Sri Fadilah[1]*, Rini Lestari[1], Mohd Hadafi Sahdan[2], Ahmad Zamil Abdul Khalid[3]

[1]Departement of Accounting, Faculty of Economic and Business, Universitas Islam Bandung, Indonesia, [2]TISSA-UUM School of Accountancy, Universiti Utara Malaysia, Malaysia, [3]School of Languages, Civilization and Philoshophy, Universiti Utara Malaysia, Malaysia. *Email: srifadilah03@gmail.com

ABSTRACT

The foremost purpose of the study is to explore the impact of renewable energy consumption (REC) on the economic growth of ASEAN countries. Data were extracted from the World Bank and ASEAN Energy Information Administration (EIA). The "Generalized Method of Moments (GMM)" approach has been used by using the STATA software for the analysis. The results unprotected that the REC and non-renewable energy consumption (NREC), growth in labor force and capital stock has positive nexus with the economy growth of the ASEAN countries. These findings provide the guidelines to the regulators that they should make the policies for the REC and NREC that increase the economy growth of the world.

Keywords: Economy Growth, Renewable Energy, Non-renewable Energy, Growth of Capital, Growth of Labor Force, ASEAN Countries
JEL Classifications: Q1, N7

1. INTRODUCTION

The decade of 2014-2024 is designated as the sustainable energy decade by the United Nations all over the globe. The cleaner environment, enhanced energy efficiency, and eclectic access to electricity are the major ways of attaining energy sustainability and also major causes of high investment in cleaner technology (Hussain et al., 2019). The improving disposition of the renewable energy addressing the changing in the climate and also creating the vast access of energy to the public who are living in the trap of poverty. According to one estimation, approximately 19.1% of world REC was due to the renewable energy (RE) sources in 2013 (Liu et al., 2017). In addition, wind, hydropower and solar PV are now the more prominent sources of electricity growth in the world. Moreover, the heating capacity growth is currently very low, but the creation of biofuels that is created from transportation is at peak from 2011 to 2012 (Hussain et al., 2017). According to the "International Energy Agency (IEA)," the share of RE in the

generation of electricity will reach 39% in 2050 from 18.3% in 2002. The CO_2 emissions will be reduced by 50% till 2050 because renewable energy is the key player in limiting the rise in the global temperature that is long term in nature (Dogan and Seker, 2016). The growth in renewable energy in recent years is only due to the incentive given by the government, like subsidies, and other incentives. These incentives increase the competitiveness of the cost of sources regarding RE. In most of the countries, RE is the most significant competitive against the causes of conventional energy. In addition, wind, hydropower and solar PV are now the more prominent sources of electricity growth in the world. Moreover, the heating capacity growth is currently very low, but the creation of biofuels that is created from transportation is at peak from 2011 to 2012. The improving disposition of the renewable energy addressing the changing in the climate and also creating the vast access of energy to the public who are living in the trap of poverty. Along with United States and Europe, the initiatives of renewable energy have invented in almost all of the countries

of Latin America, Africa and Asia. Thus, this development in the renewable energy has developed emerging installers and manufactures of new technologies regarding the renewable energy outside the United States and Europe (Cholily et al., 2019; Hussain et al., 2018).

The following statistics show that the size of the economy of Brunei is $16.18 billion while population is 0.42 million, GDP per capita is $38,760 and capacity of renewable energy is only 1 MW. In addition, the economy size of Cambodia is $16.20 billion, with 15.14 million population, $1070 GDP per capita, and 1438 MW capacity of renewable energy. Moreover, the size of economy of Indonesia is $868.35 billion while population is 250.80 million, GDP per capita is $3460 and capacity of renewable energy is 9471 MW. Additionally, the economy size of Laos is $11.00 billion, with 6.78 million population, $1620 GDP per capita, and 5118 MW capacity of renewable energy. Furthermore, the size of economy of Malaysia is $313.16 billion while population is 29.72 million, GDP per capita is $10,538 and capacity of renewable energy is 8157 MW. Similarly, the economy size of Myanmar is $44.85 billion, with 61.95 million population, $724 GDP per capita, and 3315 MW capacity of renewable energy. Likewise, the size of economy of Philippines is $272.07 billion while population is 98.39 million, GDP per capita is $2770 and capacity of renewable energy is 6482 MW. In addition, the size of economy of Singapore is $297.94 billion while population is 5.40 million, GDP per capita is $55,183 and capacity of renewable energy is 279 MW. Furthermore, the economy size of Thailand is $387.25 billion, with 67.01 million population, $5780 GDP per capita and 10,411 MW capacity of renewable energy. Finally, the economy size of Vietnam is $170.55 billion, with 89.71 million population, $1901 GDP per capita and 18,523 MW capacity of renewable energy. Table 1 shown the GDP growth and RE sources in ASEAN countries is given below.

The given figures below show that the growth in the renewable energy of emerging economies of the world. The statistics mentioned that the generation capacity of wind RE in China was increased by 110 GW from 2006 to 2014. In addition, the generation capacity of wind RE in the United States was increase by 64c GW from 2006 to 2014. Moreover, the generation capacity of wind RE in Germany was increase by 40 GW from 2006 to 2014. Furthermore, the generation capacity of solar renewable energy in Germany was increase by 39 GW from 2006 to 2014. Similarly, the generation capacity of solar renewable energy in China was increase by 35 GW from 2006 to 2014. Likewise, the generation capacity of wind RE in India was increase by 20 GW from 2006

to 2014. In addition, the generation capacity of solar renewable energy in the United States was increased by 19 GW from 2006 to 2014. Finally, the generation capacity of solar RE in India was increased by 4 GW from 2006 to 2014. Figure 1 shown the growth in RE in emerging economies is given below:

The literature about the nexus among the REC and economy growth has been taken intention widely; however, the studies about RE are still very limited. The growing importance of sources of RE has formed extensive interest for the policymakers of energy and academics (Hussain et al., 2018). This paper has several significant contributions regarding the economy growth and renewable energy. Most of the previous literature used the panels of the countries to explain the dynamic nexus among the economy growth and the consumption of energy such as renewable energy (Hussain et al., 2012). We noticed that a significant criticism of these studies regarding the selection of the countries in the panel because the countries that used in the panel have a high degree of heterogeneity as well as cross-sectional dependence across the panel. Thus, this study employs techniques that overcome the issues of cross sectional dependence and heterogeneity. The policies regarding the energy that develops internationally have also affected the individual countries' strategies, exogenous development shocks in the field of energy. In addition, this is one of the first attempts that deal the economy growth and renewable energy by using the techniques of heterogeneous and cross-sectional dependence for all ASEAN countries. Moreover, it is also one of the prime attempts that this study investigates the ASEAN countries regarding economy growth and renewable energy utilization. Additionally, this study also selected both renewable as well as non-renewable

Figure 1: Renewable energy growth in major economies

Source: Bloomberg New Energy Finance   WORLD RESOURCES INSTITUTE
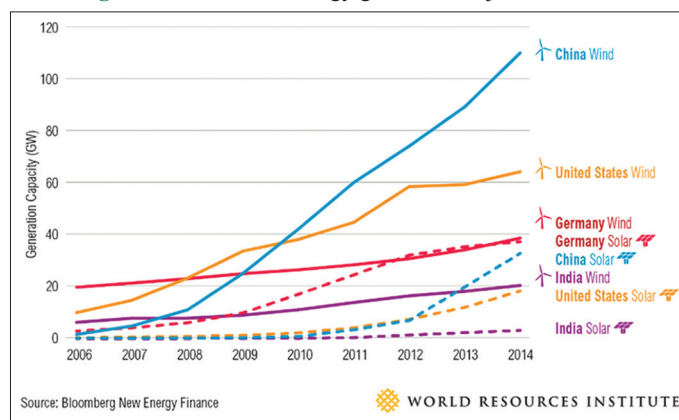
Table 1: GDP growth and renewable energy sources in ASEAN countries

Countries	Economy size (US$ Billions)	Population (Millions)	GDP per capita (US$)	Capacity of renewable energy (MW)
Brunei	16.18	0.42	38760	1
Cambodia	16.20	15.14	1070	1438
Indonesia	868.35	250.80	3460	9471
Laos	11.00	6.78	1620	5118
Malaysia	313.16	29.72	10538	8157
Myanmar	44.85	61.95	724	3315
Philippines	272.07	98.39	2770	6482
Singapore	297.94	5.40	55183	279
Thailand	387.25	67.01	5780	10411
Vietnam	170.55	89.71	1901	18523

energy together with traditional inputs so we can evaluate the relative effect of all of these factors on the process of economy growth. Furthermore, current study also estimates the labor force growth and capital stock growth with the economy growth of the countries. These investigations are very significant for the regulators to develop the regulations regarding RE and economy growth in the ASEAN countries.

The remaining paper is organized as under: Section 2 of the paper discusses about the literature about the variables and their nexus such as economy growth and REC, economy growth and NREC, economy growth, and capital growth and economy growth and growth of labor force. Section 3 deals with the data, collection of the data, methodology, and measurement of the variables. Section 4 deals with model, descriptive statistics, diagnostic analysis and regression analysis of the study. Finally, section 5 deals with the discussions, conclusions, suggestions, and recommendations to the policymakers and upcoming researchers.

2. LITERATURE REVIEW

This section of the paper discusses about the literature about the variables and their nexus such as economy growth and REC, economy growth and NREC, economy growth and capital growth, and economy growth and growth of labor force.

2.1. Economy Growth
It defines as the improvement in the common goods and services of the country for a specific time period. For the measurement of the economy grows, we must remove the inflation factor to obtain the most appropriate and accurate economy growth. The major requirement of the company, as well as the country, is to groom the economy that increases its basic goal such as profitability (Pradhan et al., 2014). In addition, "economic growth is the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP" (pp-819) (Saboori and Sulaiman, 2013). Moreover, the enhancement in the output of the country that increases the goods and services in the country that decreases the inflation in the country is associated with the economy growth of the country. Furthermore, the economy growth of the country is measured by the GDP or GNP of the country. The increase in GDP and GNP of the country refers to the high economy growth in the country (Ng et al., 2013). Thus, the economy growth is essential for the development of the country and the present study proceeds this variable as dependent variable of the study.

2.2. Consumption of Renewable Energy
Renewable energy refers to the energy that is generated from the renewable resources such as waves, rain, sunlight, geothermal heat and tides and the use of this RE in the production of goods and services is said to be the utilization of renewable energy (Abidin et al., 2015). In addition, "renewable energy is energy that is collected from renewable resources, which are naturally replenished on a human timescale, such as sunlight, wind, rain, tides, waves, and geothermal heat. Renewable energy often

provides energy in four important areas: electricity generation, air, and water heating/cooling, transportation, and rural energy" (pp-1080) (Dogan and Seker, 2016). Moreover, the use of energy can be renewed from different sources such as waves, rain, sunlight, geothermal heat and tides. The consumption of the energy that is generated from the natural resources and has the renew feature is said to be utilization of renewable energy (Al-Mulali et al., 2014). Thus, the utilization of renewable energy is essential for the development of the country and the present study proceeds this variable as independent variable of the study.

2.3. Consumption of Non-renewable Energy
It means the utilization of energy that is produced from the resources of economic values that cannot be replaced with natural resources such as coal, petroleum and natural gas. Moreover the use of energy that is produced by coal and natural gas but not the natural sources are said to be the utilization of non-renewable energy (Jebli et al., 2016). In addition, "most non-renewable energy sources are fossil fuels: coal, petroleum, and natural gas. Carbon is the main element in fossil fuels. Carbon is the main element in fossil fuels. For this reason, the time period that fossil fuels formed (about 360-300 million years ago) are called the Carboniferous Period" (pp-183) (Al-Mulali and Sab, 2012). Furthermore, the consumption of the energy that is developed from the other than natural resources is defined as the utilization of non-renewable energy resources (Halkos and Tzeremes, 2014). Thus, the utilization of NRE is essential for the development of the country and the present study proceeds this variable as independent variable of the study.

2.4. Growth in Capital Stock
It refers to the increase in the value of total assets or investment over time. It is measurement by calculating the difference between the current or market price of the assets and investment and purchase price of the assets and investment (Marwah and Tavakoli, 2004). Moreover, the improvement in the investment and assets of the business is said to be growing in the capital. In addition, "a growth stock is a share in a company that is anticipated to grow at a rate significantly above the average for the market. These stocks generally do not pay dividends, as the companies usually want to reinvest any earnings in order to accelerate growth in the short term" (pp-365) (Mahyideen et al., 2012). Moreover, the enhancement in the total worth of the business is known as the increase or growth in the capital (Hirnissa et al., 2009). Thus, the growth in the capital is essential for the development of the country and the present study proceeds this variable as independent variable of the study.

2.5. Growth in Labor Force
It refers to the increase in the labor force that is working in the country. It also refers to the participation rate of labor in the production of the country. The growth in the labor force means the increase in employed labor in the country (Choi et al., 2000). In addition, the improvement in the engaged labor force in the production of the country is said to be growth in the labor force of the country. Moreover, "the labor force is the sum of employed and unemployed persons. The labor force participation rate is the labor force as a percent of the civilian non-institutional population.

Browse various labor force characteristics. Data also are available by demographic characteristics. See also not in the labor force" (pp-35) (Hartani et al., 2015). Furthermore, the enhancement in the total labor force of the country that is employed is known as the increase or growth in the labor force (Swee-Hock, 1988). Thus, the growth in the labor force is essential for the development of the country and the present study proceeds this variable as independent variable of the study.

2.6. Consumption of Renewable Energy and Economy Growth

The economy growth of the country depends upon the utilization of RE in the production of the country. In addition, positive nexus among the utilization of RE and economy growth has been found by the previous literature (Alper and Oguz, 2016). Moreover, the increase in the utilization of RE can also increase the economy growth of the country. Furthermore, utilization of renewable energy is one of the prime factors of economy growth of the country (Rafindadi and Ozturk, 2017). In addition, economy growth is the outcome of high utilization of RE of the country. Similarly, the high utilization of RE is the evidence of high production in the country that results in high economy growth in the country. Likewise, positive linkage among the utilization of RE and economy growth has been discovered by past studies (Ito, 2017). Thus, utilization of RE is one of the vital cause of economy growth of the country and based on this conclusion the current study develops the following hypothesis:

H_1: There is positive nexus among the utilization of renewable energy and the economy growth of ASEAN countries.

2.7. Consumption of Non-renewable Energy and Economy Growth

The economy growth of the country depends upon the utilization of NRE in the production of the country. In addition, positive nexus among the utilization of NRE and economy growth has been found by the previous literature (Kahia et al., 2016). Moreover, the increase in the utilization of non-renewable energy can also increase the economy growth of the country. Furthermore, utilization of NRE is one of the prime factors of economy growth of the country. In addition, economy growth is the outcome of high utilization of NRE of the country. Similarly, the high utilization of NRE is evidence of high production in the country that results in high economy growth in the country (Shafiei and Salim, 2014). Likewise, positive linkage among the utilization of NRE and economy growth has been discovered by past studies (Bowden and Payne, 2010). Thus, utilization of non-renewable energy is one of the vital cause of economy growth of the country and based on this conclusion the current study develops the following hypothesis:

H_2: There is positive nexus among the utilization of non-renewable energy and economy growth of ASEAN countries.

2.8. Growth in Capital Stock and Economy Growth

The economy growth of the country depends upon the increase in the capital stock in the production of the country. In addition, positive nexus among the growth in capital stock and economy growth has been found by the previous literature (King and Levine, 1994). Moreover, the increase in growth in capital stock can also increase the economy growth of the country. Furthermore, growth in capital stock is one of the prime factors of economy growth of the country. In addition, economy growth is the outcome of high growth in capital stock of the country (Flores de Frutos et al., 1998). Similarly, the high growth in capital stock is evidence of high production in the country that results in high economy growth in the country. Likewise, positive linkage among the growth in capital stock and economy growth has been discovered by past studies (Pelinescu, 2015). Thus, growth in capital stock is one of the vital cause of economy growth of the country and based on this conclusion the current study develops the following hypothesis:

H_3: There is positive nexus among the growth in capital stock and economy growth of ASEAN countries.

2.9. Growth in Labor Force and Economy Growth

The economy growth of the country depends upon the increase in the labor force in the production of the country. In addition, positive nexus among the growth in the labor force and economy growth has been found by the previous literature. Moreover, the increase in growth in labor force can also increase the economy growth of the country (Maestas et al., 2016). Furthermore, growth in labor force is one of the prime factors of economy growth of the country. In addition, economy growth is the outcome of high growth in labor force of the country. Similarly, the high growth in labor force is evidence of high production in the country that results in high economy growth in the country (Kuhnle, 2017). Likewise, positive linkage among the growth in labor force and economy growth has been discovered by past studies (Hanushek and Kimko, 2000). Thus, growth in labor force is one of the vital cause of economy growth of the country and based on this conclusion the current study develops the following hypothesis:

H_4: There is positive nexus among the growth in the labor force and economy growth of ASEAN countries.

3. RESEARCH METHODS

The foremost purpose of the study is to explore the impact of renewable energy consumption (REC) on the economy growth of ASEAN countries. Data were extracted from the "World Bank and ASEAN Energy Information Administration (EIA)" from 1991 to 2015. The "Generalized Method of Moments (GMM)" approach has been used by using the STATA software for the analysis. This study examined the nexus among the consumption of non-renewable and renewable energy, capital and labor force growth with economy growth and made the following equation:

$$EG_{it} = \alpha_0 + \beta_1 REC_{it} + \beta_2 NREC_{it} + \beta_3 GCS_{it} + \beta_4 LF_{it} + e_{it} \qquad (1)$$

Where
i = Country
t = time period
EG = Economy Growth
REC = Renewable Energy Consumption
$NREC$ = Non-renewable Energy Consumption
GCS = Growth in Capital Stock
LF = Labor Force

The dependent variable such as economy growth (EG) is measured by the GDP or output of the ASEAN countries while gross fixed

capital formation (GFCF) is used to measure the growth in capital stock (GCS) and labor force (LF) is measured by the available labor force in the market. This data was extracted from the World Bank database such as "World Development Indicators (WDI)." In addition, renewable energy consumption (REC) and non-renewable energy consumption (NREC) were collected from the Energy Information Administration (EIA) (Bhattacharya et al., 2016).

4. FINDINGS

The findings consist of the diagnostic tests such as variance inflation factor and correlation matrix for multicollinearity among the variables, heteroscedasticity test for variance in error terms, Skewness, and Kurtosis test for normality of the data and Wooldridge test for autocorrelation or serial correlation in the data. In addition findings also includes the Hausman test to find the appropriate regression among "random and fixed effect models" and at the end GMM estimators are included in the results of the paper.

The first assumption of OLS regression is multicollinearity that means the variable is not highly correlated with each other that can be calculated by following equations:

$$R^2_{REC} \quad REC_{it} = \alpha_0 + \beta_2 NREC_{it} + \beta_3 GCS_{it} + \beta_4 LF_{it} + e_{it} \tag{2}$$

$$R^2_{NREC} \quad NREC_{it} = \alpha_0 + \beta_1 REC_{it} + \beta_3 GCS_{it} + \beta_4 LF_{it} + e_{it} \tag{3}$$

$$R^2_{GCS} \quad GCS_{it} = \alpha_0 + \beta_1 REC_{it} + \beta_2 NREC_{it} + \beta_4 LF_{it} + e_{it} \tag{4}$$

$$R^2 LF \quad LF_{it} = \alpha_0 + \beta_1 REC_{it} + \beta_2 NREC_{it} + \beta_3 GCS_{it} + e_{it} \tag{5}$$

$$j = R^2_{REC}, R^2_{NREC}, R^2_{GCS}, R^2_{LF} \tag{6}$$

$$Tolrance = 1 - R^2_j \quad VIF = \frac{1}{Tolerance} \tag{7}$$

The multicollinearity can be verified by the variance inflation factor (VIF) as well as correlation matrix. Table 2 shows the values of VIF that are less than 0.10 and tolerance values are less than five that means predictors are not highly correlated. The findings of VIF are as under in Table 2.

The correlation matrix also showed the correlation among the predictors and explained that no issue with multicollinearity of the predators because the values are less than 0.90 that means they are not highly correlated. Table 3 given as under shown the correlation matrix of the study.

The second assumption of OLS regression is the normality of the data that can be verified by the Skewness and Kurtosis test,

and according to the results given below, data is not normally distributed because the probability values are less than 0.05 that reject the null hypothesis of data is normal. This problem cannot be affected the results if the data are large (more than 100 observations) and this study has 250 observations that mean normality does not affect the results. Table 4 given as under shown the normality of the data in the form of Skewness and Kurtosis test.

The third assumption regarding the OLS regression is the serial correlation that is checked by Wooldridge test and shown data have serial correlation because the probability value is less than 0.05 that rejects the null hypothesis about data has no serial correlation. In addition, fourth and final assumption of OLS regression is homoscedasticity of the error term, and results show the error terms are heteroscedasticity problem because the probability value is less than 0.05 that rejects the null hypothesis about error term are homoscedastic. These problems can be handled by using the GMM estimator, and this study uses it and fixes these issues.

To select the appropriate model for the study among the "random and fixed effect models," the Hausman test is conducted. The findings of the test show that fixed effect model is appropriate because probability value is less than 0.05 that rejects the null hypothesis about random effect is appropriate. Table 5 given as under shown the results of Hausman test.

The GMM estimator shows that all the predictors have positive nexus with the economy growth of the study. The beta coefficient

Table 3: Correlation matrix

Variables	REC	EG	GCS	LF	NREC
REC	1				
EG	−0.596	1			
GCS	−0.137	0.241	1		
LF	−0.167	0.408	0.029	1	
NREC	−0.209	0.54	−0.006	0.807	1

Table 4: Skewness and Kurtosis tests

Variable	Obs.	Pr (Skewness)	Pr (Kurtosis)	adj_ Chi2 (2)	Prob>Chi2
EG	250	0.311	0.036	5.42	0.066
REC	250	0.984	0.011	6.34	0.042
NREC	250	0	0	.	0
GCS	250	0.208	0	27.66	0
LF	250	0	0	.	0

Table 5: Hausman test

	Coef.
Chi-square test value	13.461
P-value	0.009

Table 2: Variance inflation factor

	VIF	1/VIF
NREC	2.924	0.342
LF	2.873	0.348
REC	1.067	0.937
GCS	1.024	0.977
Mean VIF	1.972	

Table 6: GMM model estimator

EG	Coef.	St. err.	t-value	P-value	L.L	U.L
L.EG	0.547	0.090	6.08	0.000	0.371	0.724
REC	0.291	0.113	2.58	0.042	0.156	0.287
NREC	0.011	0.004	2.72	0.036	0.001	0.016
GCS	0.934	0.163	5.73	0.000	0.615	1.254
LF	0.112	0.045	2.49	0.035	0.021	0.155
Constant	−0.972	0.334	−2.91	0.046	−1.295	−0.016

has positive signs, while t values are greater than 1.64, and p values are less than 0.05, and there is no zero among the upper and lower limits are the pieces of evidence of positive and significant nexus among the predictors and economy growth. Table 6 given as under shown the GMM estimators of the study.

5. DISCUSSIONS AND CONCLUSIONS

The foremost purpose of the study is to explore the impact of renewable energy consumption (REC) on the economy growth of ASEAN countries. The results unprotected that the consumption of renewable and non-renewable energy, growth in the labor force and capital stock has positive nexus with the economy growth of the ASEAN countries. The finding explains the situation of the ASEAN countries that they are using renewable and non-renewable energy that enhances the development in the country that results in the high economy growth in the country. These findings provide the guidelines to the regulators that they should make the policies for the consumption of renewable and non-renewable energy that increase the economy growth of the world.

Finally, this study concluded that if the countries use energies such as renewable as well as non-renewable in a way that develops the process of the business instead of damages the environment then it will help the high economy growth in the country. This study also has recommendations for prospective researchers that are also considered the limitations of the study. Firstly, this study takes only ASEAN countries for examination, and potential researchers may add more countries under investigation. Secondly, present study use only as renewable as well as non-renewable energies as predictors of the study and future scholars may include other energies as the predictor of the study. Thirdly, the current study takes only 25 years under investigation, and further literature may include more years under examination.

REFERENCES

Abidin, I.S.Z., Haseeb, M., Azam, M., Islam, R. (2015), Foreign direct investment, financial Development, international trade and energy consumption: Panel data evidence from selected ASEAN countries. International Journal of Energy Economics and Policy, 5(3), 841-850.

Al-Mulali, U., Fereidouni, H.G., Lee, J.Y. (2014), Electricity consumption from renewable and non-renewable sources and economic growth: Evidence from Latin American countries. Renewable and Sustainable Energy Reviews, 30, 290-298.

Al-Mulali, U., Sab, C.N.B. (2012), The impact of energy consumption and CO_2 emission on the economic growth and financial development in the Sub Saharan African countries. Energy, 39(1), 180-186.

Alper, A., Oguz, O. (2016), The role of renewable energy consumption in economic growth: Evidence from asymmetric causality. Renewable and Sustainable Energy Reviews, 60, 953-959.

Bhattacharya, M., Paramati, S.R., Ozturk, I., Bhattacharya, S. (2016), The effect of renewable energy consumption on economic growth: Evidence from top 38 countries. Applied Energy, 162, 733-741.

Bowden, N., Payne, J.E. (2010), Sectoral analysis of the causal relationship between renewable and non-renewable energy consumption and real output in the US. Energy Sources, Part B: Economics, Planning, and Policy, 5(4), 400-408.

Choi, J.G., Woods, R.H., Murrmann, S.K. (2000), International labor markets and the migration of labor forces as an alternative solution for labor shortages in the hospitality industry. International Journal of Contemporary Hospitality Management, 12(1), 61-67.

Cholily, Y.M., Inam, A., Inganah, S., Effendi, M.M. (2019), The learning of the solar cell electricity among the students in junior high school. Energy Economics Letters, 6(1), 17-22.

Dogan, E., Seker, F. (2016), The influence of real output, renewable and non-renewable energy, trade and financial development on carbon emissions in the top renewable energy countries. Renewable and Sustainable Energy Reviews, 60, 1074-1085.

Flores de Frutos, R., Gracia-Díez, M., Perez, T. (1998), Public capital stock and economic growth: An analysis of the Spanish economy. Applied Economics, 30(8), 985-994.

Halkos, G.E., Tzeremes, N.G. (2014), The effect of electricity consumption from renewable sources on countries' economic growth levels: Evidence from advanced, emerging and developing economies. Renewable and Sustainable Energy Reviews, 39, 166-173.

Hanushek, E.A., Kimko, D.D. (2000), Schooling, labor-force quality, and the growth of nations. American Economic Review, 90(5), 1184-1208.

Hartani, N.H., Bakar, N.A.A., Haseeb, M. (2015), The nexus between female labor force participation and female total fertility rate in selected ASEAN countries: Panel cointegration approach. Modern Applied Science, 9(8), 29-39.

Hirnissa, M., Habibullah, M.S., Baharom, A. (2009), Military expenditure and economic growth in ASEAN-5 countries. Journal of Sustainable Development, 2(2), 192-202.

Hussain, M.S., Mosa, M.M., Omran, A. (2017), The mediating impact of profitability on capital requirement and risk taking by Pakistani banks. Journal of Academic Research in Economics, 9(3), 433-443.

Hussain, M.S., Mosa, M.M., Omran, A. (2018), The impact of owners behaviour towards risk taking by Pakistani banks: Mediating role of profitability. Journal of Academic Research in Economics, 10(3), 455-465.

Hussain, M.S., Musa, M.M., Omran, A. (2019), The impact of regulatory capital on risk taking by Pakistani banks. SEISENSE Journal of Management, 2(2), 94-103.

Hussain, M.S., Musa, M.M.B., Omran, A.A. (2018), The impact of private ownership structure on risk taking by Pakistani banks: An empirical study. Pakistan Journal of Humanities and Social Sciences, 6(3), 325-337.

Hussain, M.S., Ramzan, M., Ghauri, M.S.K., Akhtar, W., Naeem, W., Ahmad, K. (2012), Challenges and failure of implementation of Basel accord II and reasons to adopt Basel III both in Islamic and conventional banks. International Journal of Business and Social Research, 2(4), 149-174.

Ito, K. (2017), CO_2 emissions, renewable and non-renewable energy consumption, and economic growth: Evidence from panel data for developing countries. International Economics, 151, 1-6.

Jebli, M.B., Youssef, S.B., Ozturk, I. (2016), Testing environmental Kuznets curve hypothesis: The role of renewable and non-renewable energy consumption and trade in OECD countries. Ecological Indicators, 60, 824-831.

Kahia, M., Aïssa, M.S.B., Charfeddine, L. (2016), Impact of renewable and non-renewable energy consumption on economic growth: New evidence from the MENA net oil exporting countries (NOECs). Energy, 116, 102-115.

King, R.G., Levine, R. (1994), Capital Fundamentalism, Economic Development, and Economic Growth. Paper Presented at the Carnegie-Rochester Conference Series on Public Policy.

Kuhnle, S. (2017), The Growth of Social Insurance Programs in Scandinavia: Outside Influences and Internal Forces Development of Welfare States in Europe and America. Abingdon: Routledge.

p125-150.

Liu, X., Zhang, S., Bae, J. (2017), The impact of renewable energy and agriculture on carbon dioxide emissions: Investigating the environmental Kuznets curve in four selected ASEAN countries. Journal of Cleaner Production, 164, 1239-1247.

Maestas, N., Mullen, K.J., Powell, D. (2016), The Effect of Population Aging on Economic Growth, the Labor Force and Productivity. Cambridge: National Bureau of Economic Research.

Mahyideen, J.M., Ismail, N.W., Law, S. (2012), A pooled mean group estimation on ICT infrastructure and economic growth in ASEAN-5 countries. International Journal of Economics and Management, 6(2), 360-378.

Marwah, K., Tavakoli, A. (2004), The effect of foreign capital and imports on economic growth: Further evidence from four Asian countries (1970-1998). Journal of Asian Economics, 15(2), 399-413.

Ng, T.H., Lye, C.T., Lim, Y.S. (2013), Broadband penetration and economic growth in ASEAN countries: A generalized method of moments approach. Applied Economics Letters, 20(9), 857-862.

Pelinescu, E. (2015), The impact of human capital on economic growth. Procedia Economics and Finance, 22, 184-190.

Pradhan, R.P., Arvin, M.B., Hall, J.H., Bahmani, S. (2014), Causal nexus between economic growth, banking sector development, stock market development, and other macroeconomic variables: The case of ASEAN countries. Review of Financial Economics, 23(4), 155-173.

Rafindadi, A.A., Ozturk, I. (2017), Impacts of renewable energy consumption on the German economic growth: Evidence from combined cointegration test. Renewable and Sustainable Energy Reviews, 75, 1130-1141.

Saboori, B., Sulaiman, J. (2013), CO_2 emissions, energy consumption and economic growth in Association of Southeast Asian Nations (ASEAN) countries: A cointegration approach. Energy, 55, 813-822.

Shafiei, S., Salim, R.A. (2014), Non-renewable and renewable energy consumption and CO_2 emissions in OECD countries: A comparative analysis. Energy Policy, 66, 547-556.

Swee-Hock, S. (1988), Population and labour force growth and patterns in ASEAN countries. Philippine Review of Economics, 25(3-4), 187-203.