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The Role of Energy Use and Economic Growth on Environmental Degradation: Evidence from Selected Asian Countries

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Abstract

This study aims to drive the relationship between energy use and economic growth in selected Asian countries by evaluating the effect of energy use, gross domestic products, agriculture exports, land under cereal production, and carbon dioxide. This estimation uses Asian countries' data to elaborate on the relationship between CO_2, GDP, electricity consumption, land under cereal production, and exports of agricultural crops highly related to the production of output or exports. These variables impact the environment and production of any country. The unit root test is used to estimate data using the ARDL model to find the stationary data. Hausman and F-Test apply for autocorrelation by using different tests like the HAC test to adjust correlation and multi-collinearity between the variables. The brush-Pagan test also tells us to know which estimation is better between Pooled OLS and FEM (Fix effect model). Hausman tests are used for the selection of which model is best or fit for estimation between FEM and REM. On the other side, F-Test applies to the understanding of model estimation of fit model for estimation of data between FEM and Pooled OLS model. Breusch-Pagan LM is applied to select models between the pooled OLS model and REM. Results show that the Asian countries' GDP is positively and significantly related to CO_2 emission. The results of the use of energy show a positive and significant impact on economic growth, but it has an inverse effect on CO_2. Result shown that relation between CO_2 and GDP are impacted the country's output production and use of energy over the time increasing. Land under cereal production has also the positive relation with CO_2 over the time in Asian countries. The second model has shown some different results if we are using GDP as explained variable and other variable are us as explanatory variables. GDP and use of energy between inverse relations. That shows that if a country's output increases due to energy use, it falls over time in Asian countries.

Keywords: Environment, Asian countries, Consumptions of energy, Economic growth.

Introduction

Traditional energy sources have caused the leakage of carbon dioxide (CO_2) which helps to deteriorate the quality of the Environment (Apergis et al., 2010). Environmental degradation also affects human health and the Environment in Pakistan. Shahbaz et al. (2013) has estimated use of daily life has massive causes raising the carbon dioxide level in the environment, use the fossil fuels in daily life, increasing factories' production of smoke, and consumption of wood as a use of energy in the production process. Carbon dioxide has affected the economic level as well as the economy and the production of the agriculture sector. Chaudhry (2010), Pao and Tsai (2010), and Siddiqui (2004) have estimated the relationship between energy consumption, GDP (Economic growth), and continued environmental change. Many researchers have estimated the relationship in devolved economies, such as European and American countries use for estimating such relations estimated

(Kasman & Duman, 2015). Most of the estimators have concluded that the development economy and Energy consumption affected the CO_2 emission (Carbon Dioxide). Enhancing the level of agriculture sectors has a leading factor for researchers to elaborate on the different interests and also evaluate the relation of agriculture sectors with the use of energy and implementation over time and its effect on growth as well as the environment. To evaluate this relation we research different examples, of the impact of energy use on the agriculture sector by evidence of America checked by Kennedy (2000) to show the efficiency of agriculture sector fields. The author uses different economic models to examine the relationship of the role of energy use with agriculture sectors (Chandio et al., 2019; Karkacier & Goktolga, 2005). Poor management in the use of energy sectors attracts poor services rapidly in the country, it also causes a lack of efficiency and provision of energy, resulting in a growth rate is move on decline (Mozumder & Marathe, 2007).

The role of energy sectors is also determining the growth in the country and different sectors grow its altimeter the development in economic, many researchers have evaluated the relation in the past to explain the relation between economic growth due to use of energy by applying the different methods (Al-Mulali & Sab, 2012; Lee & Chang, 2007; Tang & Tan, 2015). These studies have explored the relation of energy consumption and economic growth in the prospective of agriculture sectors of different countries. Many other researchers showing the gap in literature in the evidence of China. The stating studies of this relation has been mentioning by the growth rate is raise in agriculture sector productivity by the different countries of the world (Kumar et al., 2013; Rehman, 2013). The studies are suggesting that consumption of energy is main element of economic growth that play an important role in to determine the consumption rate as well as growth factors help to raise the development. Pakistan has played an important role to enjoy the economic growth due to raise the consumption level of energy in different sectors in the previous years (Ozturk & Mi, 2010; Gao et al., 2020). These studies showing the positive relation and significant in short run by using the time series data applying ELC (Energy use) relation with AGE (Agriculture exports) showing positive and significant relation in short run and long run (Chandio et al., 2019).

However, most of the studies is also explain the relation between energy consumption and economic growth of the country, agriculture export is the main indicator to evaluating the relation between AEG, ELC, OILC and GASC, the are the main factor of energy consumption on any country that is affecting the production rate use for export, to raise the output oil is the main factor agriculture productivity (Ghimire et al., 2021). To elaborate this relation many studies is existing in the literature that is using the OILC and GASC as the main indicator for the growth of any country (Bianco, 2018; Chandio et al., 2019; faridi & Murtaza 2013; Tapia et al., 2018). These studies are showing the relation is inefficiency and efficiency of these indicator to boost the economic level or not by applying ARDL model. The ARDL methodology is use and resultant showing the significant in short run but in different countries showing insignificant in long run relation of agriculture energy consumption and economic growth. Mostly economist is applying the common least square (OLS) on the basis of using non-fix time period of the data and fix time period for estimation the relation by utilizing the ARDL method. This technique is helping to estimate the short run relation and long run relation between the explained and explanatory variables (Chandio, 2019; Narayan, 2005; Sharif et al., 2020). The estimation of these studies is showing that AGExp is showing the positive impact on economic growth of the countries that enhance capital, technology, and resources in the agriculture sector thus improving the AGExp and economic growth of the country. Similarly, some studies in the past explain the relation is existing between AGExp (Agriculture exports) GDP (Gross Domestic Product). The researcher that is estimating this relation is Gilbret et al. (2013) the purpose of the researcher to elaborate the effect of agriculture of economic growth as well as using different agriculture product like Coffee, Banana and Cocoa.

Alam et al. (2012) adopted the GMM (Generalized Method of Moments) to estimate the effect of economic indicators (Population density, Resources, Energy Consumption. And Financial Development) on populations (CO_2 emissions) taking the period 1975 to 2013 in Malaysia. The study finalized that energy consumption and financial development increase CO_2 emissions in the country. On the other side other group is said that any valuable growth influence on the environment in one nation may be have negative relation for the other nation

at the same time or vice versa. To avoid the defect, therefore, using a number of time series studies has been carried for the verifying this relation estimation results (Jalil & Mahmud, 2009; Baek & Pride 2013; Ahmed & Zeshan, 2014; Dogan & Turkeul, 2016). In this study, we estimate the relationship between energy use and economic growth on environmental degradation: evidence from selected Asian countries. To estimate this relation by taking the Asian countries' data low number of studies exist. The purpose of the study is to estimate the impact of energy use and economic growth on environmental degradation.

Methodology

To measure the comprehensive and suitable results, current study is recognized in two different section, initial section consists of ARDL auto regressive model use to explore the economic growth, second section contains statically tools that explore the correlation of study under discussion. However, the selected methodology has strong theoretical background and has great importance for the analysis of secondary data. The researcher has decided to estimate the relation between use of energy effects on economic growth as well as effect on environments, in selected Asian countries. To analyze this effect, use CO_2 emission, GDP, energy use, land under cereal production, agriculture exports. Therefore, data of the estimation is 28 years over the time period 1991-2018, panel data, applying the ARDL (Auto Regressive Distribution lag) modeling technique to calculate by using different explained and explanatory variables.

Data Sources

According to the importance of the problem under discussion, current study covers the Asian countries and comparison between these. Calculations data of the study area is based on the secondary data which is taken from WDI, World Band data set and economic surveys. To estimate the penal data using main five variables include GDP is the major indicator of every country, CO_2 is the main cause on Environment, LUCP shows how much lad is cultivated or not, EXP of agri-products shows how much trade is doing by this country over the time and E-Use is main source of production on other side it effects the environment. GDP and CO_2 use as a dependent variable in different model to estimating the relation and effects on environmental degradation. Agricultural export is one of the main sources of any country GDP. Energy using indicating major production input in Asian countries.

Estimation Methodology

In order to figure out "The role of energy use and economic growth on environmental degradation: evidence from selected Asian countries, we are looking at the group of 21 Asian countries from the year 1991 to the year 2018. It is better to look at panel data we estimating the results and efficiency of the methods which are applies for estimation. The following are some of the benefits of using panel data estimations: (1) it controls how well variables, like energy use, GDP, are understood. (2) It has a large sample size and better estimations of coefficients. (3) It takes into account how biased variables are and how they differ from one another in availability of

Selection of Model

The question is here when we analyzing penal data which model are more suitable, random effect model and fixed effect model (REM or FEM)? Hausman test are used to check which one is better for estimating of data between random effect model and fixed effect model. F-test help to comparing pooled OLS and random effect model which is more appropriate. Breusch-Pagan LM test applies for checking or selecting of the model from pooled OLS and REM (Random effect model) which is more effective from these. To estimate the asymptotic chi-square distribution choosing the FEM or REM, Husman test. P-value = prob (chi-square (4) > 369.033400 = 0.000 small value, the test of Hausman is showing that coefficient estimated by random effect and fixed effect model is not matching with each other. P-value signification shows in favor of fixed effect.

Random Effect Model

The REM is telling us how to estimate the effect of each specific importance that's are not measureable or

measured. This is also helped to control the un-observed heterogeneity, when this in exist in the data over the time it causes the problem of no correlation with independent variable. This method is inspired from the anabatic so well call them error components model for estimation ECM and REM "random effect Model". To estimating this author applies this method of model.

$$Yit = \beta oi + \beta 1\ X1it + \beta 2\ X2it + \beta 3\ X3it + \beta 4\ X4it + uit \quad (1)$$

We are assuming that the random value of this mean of βo is (not subscript from i here) using instead of βoi as a fixed effect model (FEM). Intercept value of every country of region of Asia is defined as:

$$Boi = \beta o + \varepsilon i \quad i = 1, 2. . . N \quad (2)$$

Where is εi error term of random variable error term which mean value of this term is = zero and also the variance of this also $\sigma_{2\varepsilon.}$

$$Yit = \beta o + \beta 1\ X1it + \beta 2\ X2it + \ldots\ldots\ldots + \varepsilon i + uit$$

$$= \beta_o + \beta_1\ X_{1it} + \beta_2\ X_{2it} + \ldots\ldots\ldots\ldots + w_{it} \quad (3)$$

Where;

$$w_{it} = \varepsilon_i + u_{it}$$

Where is εi random term of our estimate regression model? The mean of this error tem is = to zero and also the variance of this error term is $\sigma^2\varepsilon$. This error term of the model is including two main components, first is εi, which is the cross-section, specific for everyone, u^{it} and also for error components. That shows it is the combination of both time-series and cross-section error term components in this model.

For estimating the relation that is accepted help to generalize the economic development over the time in Asian countries (21), by applying the econometrics models, we can say that in general form those relation which are estimable in the number form. The econometric methods are based on the biased results. The estimator is applying different techniques to detect the different errors of data and remove these by applying different tests. For estimating this relation correctly these tests are need to apply. The author uses to evaluate the relation different variables such as Gross domestic products (GDP), energy use (E-Use), land under cereal production (LUCP), agriculture exports (AGExp) and carbon dioxide (CO_2). To estimating the relation following models are applies:

$$CO^2 = \alpha + \beta 1\ GDP + \beta 2\ Exp + \beta 3\ LUCP + \beta 4\ E\text{-}USE + \varepsilon t \quad (4)$$

In panel data, this equation converts into Lag form as follow:

$$CO^2\ i_{t-1} = \alpha + \beta 1\ GDPi_{t-1} + \beta 2\ Expi_{t-1} + \beta 3\ LUCPi_{t-1} + \beta 4\ E\text{-}USEi_{t-1} + \varepsilon ti \quad (5)$$

Where; GDPi = Gross domestic product (i),

E_Use = Energy use (kg of oil equivalent per capital)

EXP = Exports of goods and services (current US$) million dollar

LUCP = Land under cereal production

CO_2 = Carbon dioxide in million ton

εt = error term;

t = time period

βs = parameters.

After using the unit root estimation of (Levin Lin &Chu, ADF-Fisher Chi-square, I P Shin W-stat and PP-Fisher Chi-square), we estimated the GDP at level variables of our data not significant, that indicated data is not significant at level, so we convert this at 1st lag this conversion change the data into 1st level signification. This is same of our all-variables CO_2, AG-Exp, LUCP, and E-Use is not significant at level. Due to this we check this at 1st different it shows all variables are significant at 1st different level.

Results and Discussion

Stationary Tests

In this study we used the penal data of difference variables. To find the stationary of the data use 21 Asian countries data 1992-2018. This method told us the existence of series is existing between two or more variable then we do not apply this that then meaningful relation is existing between these variables. If data not stationary, it means, (variance of variables estimated and auto correlation between variable and time is not independent) this regression involve the series reverse applying on existence relationship. This type o relation is called spurious regression by Granger and Newbold present in 1974. We ignore like this estimation which exist non-stationary variables this estimation caught the wrong results that are not effective and wrong estimated analysis. To find the unit root in penal data we apply different tests. Unit root test of panel data is explained by Levin Lin &Chu, ADF-Fisher Chi-square, I P Shin W-stat and PP-Fisher Chi-square. So, we are applying these tests to estimate the stationary is existing between data or not. Following results of unit root estimation is given in Table. 1 which show the stationary of data at level and 1st difference.

Table 1. Estimation of unit root test (At level and 1st difference).

Variables	Data Type	Test Statistics Probability	Levin, Lin & Chu t*	Im, Pesaran & Shin Wstat	ADF - Fisher Chi-square	PP - Fisher Chi-square
CO2	Level Data	Test Statistics	4.86982	7.0446	14.7795	29.4734
		Probability	1.0000	1.0000	0.9993	0.778
	1st Difference	Test Statistics	-3.7789	-60830	115.213	236.54
		Probability	0.0001	0.0000	0.0000	0.0000
GDP	Level Data	Test Statistics	5.59869	7.51815	11.3921	7.10255
		Probability	1.0000	1.0000	1.0000	1.0000
	1st Difference	Test Statistics	-7.0967	-5.9536	72.3257	108.079
		Probability	0.0000	0.0000	0.0000	0.0000
AGExp	Level Data	Test Statistics	3.43867	5.27594	11.7812	9.20508
		Probability	0.9997	1.0000	0.9999	1.0000
	1st Difference	Test Statistics	-10.513	-10.198	165.226	247.751
		Probability	0.0000	0.0000	0.0000	0.0000
LUCP	Level Data	Test Statistics	-3.5472	-1.894	67.4157	97.5297
		Probability	0.0002	0.0291	0.0012	0.0000
	1st Difference	Test Statistics	-10.126	-10.492	134.062	250.559
		Probability	0.0000	0.0000	0.0000	0.0000
E-Use	Level Data	Test Statistics	3.91919	5.29834	26.9732	67.8836
		Probability	1.0000	1.0000	0.8617	0.001
	1st Difference	Test Statistics	-4.1889	-7.1273	90.951	171.226
		Probability	0.0000	0.0000	0.0000	0.0000

Unit root test statics o four methods applies (Levin Lin &Chu, ADF-Fisher Chi-square, I P Shin W-stat and PP-Fisher Chi-square) for GDP at level are not significant, that indicated data is not stationary at level. Data is stationary after transforming data into 1st difference from test statistics. This is same for four variables GDP, CO2, AGExp and E-Use but difference for LUCP. When applies the data statistics at level for LUCP it indicated that data is stationary at level. It means data of LUCP is stationary at level. After transforming the data of four

variables GDP, CO_2, AGExp and E-Use in first difference test statistics showing significant or stationary data that indicated that the data is stationary at first level.

Selection of Model and Estimations Results

In researcher point of view many researchers has prefer to choose the gravity model for estimating the time series and panel data evaluation, this model is effective for time varying variable such as GDPi and CO_2 emission of this research main variable, this model not only include time variant variable also use time invariant variable for estimating the good and effective results. FEM (fixed effect model) are not allowing to the estimator to estimate the time in variant variable (Rahman, 2003). REM (Random Effect Model) and Pooled OLS model allow the estimate to observe the time in variant variable with its characteristics.

If we sight on the Hausman test is one of the more effective tests that is used for checking which model is most appropriate for analysis of data between FEM (Fixed Effect Model) and REM (Random effect model). F-test is also applying for choosing the models for estimating data which is effective and reliable between Pooled OLS model and FEM (Fixed Effect Model). LM test of Breusch-Pagan is also applying for selection of the best and appropriate models between REM (Random Effect Model) and Pooled OLS model for estimating the panel data.

Hausman Specification Test (Random Effects or Fixed Effects)

In the estimation of REM (Randon Effect Model) the main assumption is used that the REM (Random Effect) is not correlated with our independent variables that is used for estimation of random effect model. To check this most common method or test is Hausman test (1978), that's helps to compare the effectiveness and most appropriate model of estimation of coefficients between random effect model and fixed effect model.

After estimation the Hausman test the major work of estimator to decide the selection about models REM or FEM. Results of Hausman test having Chi-square distribution H=302.004 p-value=prob (chi-square (4)>302.004=0.000. Small value of p-value of Hausman test are showing that the estimation results of random effect model and fixed effect model not matching with each other. Signification of overestimated p-value is not in favor of selecting the FEM (Fixed effect model) was not reliable for this estimation of Selected Asian countries data analysis. For Hausman test, the author is applying following null hypothesis and alternative hypothesis.

H_o: v_i is no correlation with X_{it} (REM appropriate)

H_i: v_i is correlated with X_{it} (FEM is appropriate)

Table 2. Correlated Random Effects - Hausman Test.

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-Section Random	369.0334	4	0

**Warning: Cross-section estimation of Random Effects Variance is equal to zero.

F-Test (Fixed Effects Model or Pooled OLS)

For the checking of which model is best between pooled OLS and fixed effect model estimator, we used F test. Estimator of the analysis is used Pooled OLS model as base line for comparing the models of analysis. The author applies the significant test for estimation is F-Test that is very effective and common to comparing the F-test and R^2 changed.

$$\text{F-Test} = \frac{(R^{2\ \text{FEM}} - R^{2\ \text{Pooled OLS}}) / N-1)}{(1-R^{2\ \text{FEM}})\ (NT-N-K)}$$

T= total number of observations of variables (588)

N= total number of groups or cross-sections (21)

K= number of regression model (6)

The results of F-test if R^2 is significant it shows that it is statistically significant effect impact on the groups of data. It means it is highly significant on the null hypothesis that's show Pooled OLS model is effective for selection to estimating the data, and alternative hypothesis or model is rejected. After applying the F-test we conclude that fixed effect model is appropriate the Pooled OLS model for estimation.

Where N= 21, T= 588, K=6, R^2_{FEM}=0.6438, $R^2_{Pooled\ OLS}$=0.4377

By putting these values into equation, we get the values of F-test was founded value as= 43.32. F-test results shown that against o null hypothesis that Pooled OLS model was effective, but results are in favor of (FEM) fixed effect model.

Bruesch-Pagan Lagrange multiplier test (Pooled OLS or Random Effects)

The reseacheer has us the Pooled OLS model and Random effect model (REM) to estimate the time invariant variable in panel data estimation. For selection of model which is more appropriate between OLS and REM the mostly estimator applies Breusch-Pagan LM test which is presented by (Breusch-Pagan, 1980). Folling hypothesis is applied for checking the appropriation of model

H0= Pooled OLS model is effective for estimation

H1= REM (Random Effect Model) is effective for estimation

The estimator made decision on the basis of Breusch-Pagan LM test values. Whether Pooled OLS model or Random effect model (REM) is effective for estimating the data.After applying the F-test and Hausman test to check the appropriation of the models FEM (Fixed effect model and Pooled OLS model is effective for time variants units. Mostly researcher use Pooled OLS and Random effect Model for estimating the time variant variables, but Bruesh-Pagan LM test is applying to check the appropriation of the model which is effective for time variant variables between them.

Table 3. Estimation of Residual Cross-Section Dependent Test.

Residual Cross-Section Dependence Test			
Cross-sections:	21		
Total Panel Observations:	567		
Cross-sections means were removed during computation of correlations			
Tests	Statistic	d.f.	Prob.
Breusch-Pagan LM Test	461.12	210	0.000
Pesaran scaled LM Test	12.25		0.000
Pesaran CD	11.85		0.000

After estimating the Bruesh-Pagan LM test to check the signification of LM test that indicated the Random effect model is more appropriate as compare to Pooled OLS model. The results of Table 3 is showing the significant of LM test which indication of Random effect model. After applying all three testes (Hausman Specification test, F-test, and Breusch-Pagan LM test) are concluded that for estimating the date two models are more appropriate which one of the Random effect model estimator for time in variant variables and other is fixed effect model for time variant variable of the data set.

Estimation of Fixed Effects Model (CO_2 explained variable)

After applying the both tests basis of (F-test and Hausman test) that indicate the, fixed effect model is effective for time variant variables, estimation of FEM (Fixed Effect Model) is given in the Table 4.

Table 4. Estimation of Fixed Effects Model (CO_2 explained variable).

Variables	Coefficients	std.Error	t-Statistics	Prob
E_USEi	0.01	0.00	0.55	0.58**
EXPi	0.01	0.00	11.30	0.00*
GDPi	5.92	1.93	3.06	0.00*
LUCPi	0.00	0.00	0.85	0.00*
C	-4.06	2.78	-1.45	0.14**
Adjusted R2		0.53		
Durban-Watson Stat		1.17		
F-test		161.76		
Prob-F-test		0.00		

HAC standard error is used for removal of Hetroscedastisity; *= significant at 5% level of confidence; **= Not significant; Source: Author's calculations.

According to calculating of F-test and Hausman specification test, FEM was considering the appropriate model for checking the effect of CO_2 emission effect on Asian countries und explanatory variable Eney use, Goss Domestic Products, Land Under Cereal Production and aculue Expos. F-Test value was 161.7 which is highly significant, explaining that over all appropriation of this model.

Table 5. Multicolinearity among variables used in Fixed Effects Model.

Variables	VIF
E_USEi	0.01
EXPi	0.01
GDPi	9.10
LUCPi	0.01
C	0.52

Source: Author's calculations

To removing the problem of heteroscedastisity, by applying HAC standard errors test used during estimating the units. Most of the estimators are applying the Newey-West standard to resolve the issue of hetroscedastisity in the given data set. The main point is for producing of new west standard errors is valid in large sample size. If the sample is large in estimation Newey-West procedure for correcting the standard errors like this situation of hetroscedastisity and autocorrelation. HAC test handle both, unlike white method, which designed especially for hetroscedasticity. Autocorrelation was analysis by Durban Watson test for the estimated model of given data of Asian countries. The value of this too close to 2 was signed of autocorrelation in this model.

DW is less than 2 it means positive autocorrelation.

DW is greater than 2 it means negative autocorrelation.

Estimation by Random Effect Model

Fixed effect model does not allow to estimate the invariant variables (Rahman, 2003). However random effect model is allowing the estimate time invariant units (Greene, 997). Roy and Rayan used REM (random effect model) for estimation of time invariant variables effect in panel data analysis in 2012.

Table 6. Multicolinearity among variables used in Random Effects Model.

Variables	VIF
E_USEi	0.01
EXPi	0.01
GDPi	8.40
LUCP	0.00
C	-0.48

The estimation of this REM (Random effect model) is showing that there is no multicolinearity is existing in the model, because the values of variant factors of all variable is lesser than ten, that indication of multicolinearity. The estimator has wanted to resolve this problematic multicolinearity applies the HAC hetroscedastisty standard error test, this is used to evaluating the result of REM (Random effect Model) Biased.

Table 7. Estimation by Random Effect Model (CO_2 explained variable).

Variables	Coefficients	std.Error	t-Statistics	Prob
E_USEi	0.01	0.00	0.70	0.47**
EXPi	0.01	0.00	14.48	0.00
GDPi	5.92	1.51	3.92	0.00*
LUCP	0.00	8.04	13.91	0.00*
C	-4.06	2.17	-1.86	0.06
Adjusted R^2		0.53		
Durban-Watson Stat		1.17		
F-test		161.76		
Prob-F-test		0.00		

HAC standard error is used for removal of Hetroscedastisity; *= significant at 5% level of confidence.

Conclusions and Recommendations

Asian countries' GDP is positively and significantly related to CO_2 emission. Our estimation is based on Asian nations' impact on energy use, economic growth, and the environment. The energy use results show a positive impact, a significant impact on economic growth, but it has the inverse effect on CO_2. When the nation uses more energy, its production level rises. Industries have more energy for production and transportation due to the rise in production levels. Results show that the relation between CO_2 and GDP impacts the country's output production and use of energy over time. Most of the energy is using the production of agriculture input, and in terms of this, our output is raised. It is the green signal of exporting of goods. This relation shows the positive impact of CO_2 on output level. The other side shows that if the GDP of these countries rises due to CO_2 rises, it means the environment has a negative impact. Land used for cereal production also positively relates to CO_2 in Asian countries. The second model has shown different results if we use GDP as an explanatory variable and other variables as explanatory variables. GDP and use of energy between inverse relations. That shows that if a country's output increases due to its energy use, it falls over time in Asian countries. Because of GPS, new methods of production that utilize less energy and more production or use of

substitute energy like solar, pan electricity, etc., are used. Other than this, all other variables have a positive relation with GDP, according to the results of FEM (fixed effect model), GDPi (i= 21 Asian countries) on CO^2i. The coefficient of GDPi of Asian countries is 5.92 percent. The e-USEi coefficient also has a positive relation with CO_2 emission as we raise the use of energy due to the rise in carbon dioxide. If countries' exports rise due to CO^2 emissions, they also rise because the country needs more energy to produce things for export. The debate shows that energy and exports positively impact the environment. Land used for cereal production also positively impacts the environment. Applying the HAC test for the removal of heteroscedasticity between UN prob variables.

The policy implementation is that when we see the estimation, that helps to improve sustainable developments and environments. So, the leaders of developing economies should put a lot of effort into sustainable policies that affect the economic growth, production, and environments that are helping to reduce CO_2 emissions. Also, the financial institutions in Asian countries need to make green investments and budget on things important for long-term growth. Stockholders may have played a big role in preventing the sustainable growth and improvement of the green environment by using natural resources. This will help the economies of Asia come up with green derivatives energy utilization of substitutes. Also, the governments of these economies should play a role in cleaning green Asian countries by applying different policies, such as Pakistan's "Clean and Green Pakistan." It is only possible if financial institutions and different firms' investment will support green production in these economies. Also, for a big change in the way financial policymakers think to the following rules, to stabilize the economy, raise the production level, use of the energy that is less polluted and financial development work against the effectiveness of regulations and meeting of carbon mitigation goals. This thesis has some flaws; we look at the relationship of GDP and CO_2 emission that is affected by using energy. We look at the polluted area and how to decline this by using the substations and government policies implementation; most Asian countries' cities are very polluted due to unseen of governments as well as the rising population level, which is affected by the rise in infrastructure, low number of the new plantation, not use of alternatives of energy uses, land for production is decline due to not using of new technology, etc. in further, studies we can expanded to look the pollutant area which are more affected reason, comparison of Asia with other regions, alternative energy us effect on production level as well as on CO_2, fiscal or monetary policy effects on green development.

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