The Effect of Gross Domestic Product, Urbanization, Trade Openness, Financial Development, and Renewable energy on CO_2 Emission

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Abstract
Pakistan is among those countries where the standards for environment-friendly energy sources have not complied as they should be. This investigation aims that CO_2 Emission is a dilemma for the modern world. It harms the climate and other aspects like the ozone layer, so we have incorporated certain variables to figure out a way to reduce CO2 emissions. The analysis is performed on E-views, and the World Bank's website is used for data extraction. The data incorporated is from the year 1985 till 2018. Different statistical tools are applied in this research to overcome biases in data results. Further, all such methods are applied, with common reliability in their results. The stationary test is applied to check the stationary level, and the results are satisfied on leg II of the stationary test. Another most commonly used method is regression applied. The regression results are also satisfied with the hypothesis of the study. Cointegration results found long-term relationships among variables, and granger causality is applied for cause and effect measurement. The study results revealed that Renewable Energy has a significant and negative effect on Carbon dioxide emissions. At the same time, Gross Domestic Product (growth) builds an insignificant and negative relationship with Carbon dioxide emissions. Meanwhile, Financial Development (private sector), Trade Openness, and Urban Population have a significant and positive relation with Carbon Dioxide. This research contains an insight for government officials that reveals what CO_2 emissions are derived from and how it could be reduced.

Keywords: Trade Openness, Renewable Energy, CO_2 emissions, and Gross Domestic Product

Introduction
Renewable energy is one of the electric energy sources that does not contain carbon and increasingly competes with other energy. The main factors of renewable energy are wind energy (air), solar system energy, hydroelectric water energy, and wave energy. The diversification of renewable energy is one of the differences between renewable and fossil fuel energy. Furthermore, the potential of its usage anywhere in the world and its main benefits is that it does not generate carbon dioxide, which becomes the cause of climate change or reducing Emissions. The international energy agency (IEA) described the significance of renewable energy, which reported that it had become the second big required source of electricity. According to the IEA, world electricity demand will have increased by 70% by 2040.

Furthermore, it is part of final energy use will increase from eighteen percent to twenty percent during the same period. It is essential to increase the usage of renewable energy and continuously reduce the traditional energy sources because sustainable economic growth is associated with this energy (Jenkins & Nicholls, 2010; Scott & Becken, 2010). Renewable energy is the requirement of the future. It is one of the best ways to mitigate gas or carbon dioxide emissions. Further, it reduces global warming through sustainable energy countries were shifting their energy consumption from fuel to renewable energy, like a $200 billion power development has just been signed off in Saudi Arabia which tripling the country's electricity capacity, similarly in China Jiuquan wind power base project has approved by the government as it is one of the highly populated countries of the world. It will help the country to reduce carbon dioxide emissions. Renewable energy projects benefit consumption users and benefit the business owner. They can earn through surplus energy whether they store it and then use it later or sell that surplus generated energy to the grid, which could be a new way to profit from the non-core business.

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Further, it generates investment and lowers their overall energy costs. ISik et al. (2017) described that counties that shifted their energy consumption to renewable energy could brand themselves as environmentally friendly. However, it is one of the costly task to transition from traditional energy to Renewable Energy. Turk et al. (2017) analyzed that the foremost objective of every country is to overcome unemployment, increase more jobs, enhance their gross domestic product (growth), export more and enhance tax revenue 7 countries generated 36% (400 million) of the tourist arrival in 2014 while their carbon dioxide gas emission was 47% of the world (international energy statistics, www.eia.gov)

Many studies were conducted related to this study. Each described the strong relationships between CO2 emissions (carbon dioxide), financial development, and its relationship with domestic economic growth. When income increases, it will cause more foreign investment in the country, this inflow of investment should be in energy, so wastage should be reduced (Chandran & Tang, 2013). Further, it has been founded that another problem of greenhouse gas is that it causes CO2 and affects primary energy; hence fossil fuel leads to having carbon emissions.CO2 emissions, financial development, and fossil fuel have long-run relationships that all existed when one of them was available (Behera & dash, 2017). Foreign direct investment is one of the factors which decreases CO2 emissions because once foreign direct investment (FDI) means an inflow of more funds and new technology arrives, it improves environmental standards. At the same time, economic growth does not ensure any decrease in CO2 emissions. If the country brings its energy consumption to the modern way of producing energy, it could cause to decrease in CO2 (Mert, M., &Bölük, G. 2016). FDI increases RE projects and investment Stock market is one of the indicators of foreign direct investment, and FDI harms CO2 emissions. ParamatI and Gupta (2017) investigated that FDI strongly decreases CO2 emissions in their study. Still, on the other hand, stock market growth decreases in developed countries as developed countries already have a sufficient amount of investment. They initially developed such projects which reduce the Emission of CO2, and the government in such countries promoted more policies that reduce CO2 emissions.

The temperature of the global surface has average, increased. The glaciers and sea ice are melting glaciers. It causes alarm humans and affects our planet, weather, and climate systems. The Paris conference on climate change in 2015 alarmed the global community to take steps and reduce its greenhouse gas emission. However, many countries showed their determination to reduce CO2 still. It is above the limit of 2 ℃, which scientists decide.

Further, they are anxious that the temperature could reach 30 c by 2050 (Agreement, 2018). All this situation enhances natural disasters and could destroy the world climate. The annual GDP of countries will shrink to 2-4% by 2040 a d10 by 2100% (Solomon et al., 2007). Foreign investment has significant environmental consequences, so investigation related to FDI is necessary (Zeng & Eastin (2012). Investors consider ASEAN one of the best places to invest because developing counties have poor environmental standards, which provides foreign investors an opportunity to not care about CO2 emissions (Pao & Tsai, 2011).

1.2 Research Objective

This research aims to investigate:

- The impact of Renewable Energy (RE) on Carbon Dioxide Emissions in Pakistan.
- The impact of Consumption on Carbon Dioxide (CO2) Emissions in Pakistan.
- The impact of Gross Domestic Product on Carbon Dioxide (CO2) Emissions in Pakistan.
- The impact of Urbanization on Carbon Dioxide Emissions in Pakistan.
- The impact of Trade Openness (TO) on Carbon Dioxide Emissions in Pakistan.
- The impact of Financial Development on Carbon Dioxide (CO2) Emissions in Pakistan.

Literature Review

The research described the connection between environmental decadence and economic growth. The results have remained different from country to country, which created a scholar's interest to examine it differently, as reflected by EKC (Environmental Kuznets Curve), which Simon Kuznets (1960) analyzed. This research states that every country undergoes industrialization, which overcomes agriculture and economy shift to the cities that create an inequality situation where the owner of the industries hold a major part of the income where the employee seems to have decreased in their income further Kuznets stated that inequality had followed an inverted "U" shape as it increases and then decreases again with the increase of income per capita. He stated that Initially, GDP (growth) is positively related to environmental pollution, and it causes environmental pollution until it reaches a reasonable point where it decreases because of many changes which come from new investment in the pollution-free economy and clean industrialization that CO2 frequently rises with the rises of economic activities. He found a negative relationship between income level and CO2 emissions. With an increase in income level, pollution will decrease. A similar study conducted on G-7 countries by Shahzad (2018) examined biomass energy consumption, leading to more CO2 emissions. He further investigated that the EKC analysis hypothesis is more accepted in G-7 countries where capitalization has decreased CO2 emissions. Environmental quality has improved with the increase in the level of F.D. (private sector), similarly institutional quality, UP impedes environmental quality, and TO also helps decrease the degradation of the environment, whereas globalization increases pollution.

The world realized that environmental degradation affects the climate and countries' overall economies. It has been observed that global warming caused by CO2 emissions is one reason for heatwaves, extreme weather, stress to the food production system, and climate change. In recent decades many efforts have been made to eliminate factors that cause global warming. Amri (2018) revealed an interrelationship between trade and usage of RE and non-RE. The trade will increase whenever this energy consumption increases, and both are beneficial for the economy further. He suggests some incentive to intuitions that use RE and intuitional quality improvement can improve environmental sustainability and facilitate the usage of non-RE.

Azeem (2018) studied the relationship between renewable energy generation and carbon emissions. The data cover 1980 to 2015, and variables that remained part of this study were renewable energy and carbon emissions. This CO2 Emission is evaluated in Canada, Italy, and Iran. Cointegration, regression, and granger causality are used in this study. The results of the analysis confirmed that countries where renewable energy increases have decreased the utilization of fossil fuel, which generates carbon emissions. The finding of this study declared physical evidence to enhance the usage of renewable energy to overcome CO2 emissions.

Alfonso et al. (2019) investigated the relationship between economic growth and determinants, including energy consumption and energy prices. The impact was checked in Asian developing countries; a few specifications were added to analyze the countries that used renewable energy as their energy source. Many years were used in the data analysis from 1971 to 2015. The results for Indonesia and India seem too much different from other countries. The policies of India in favor of renewable energy are found more different from other countries. Unit root test, cointegration, and granger causality test remained to perform analysis. Results show causal interaction of income, energy, and prices. Countries that adopt policies related to energy production have low prices and increasing GDP. This is true mainly for countries like Thailand and the Philippines, whose income, energy, and prices appear to be more integrated than in other countries.

Bulut (2019) stated that RE decreases the emissions of CO2; RE has a negative relation with CO2 emissions, which means whenever the consumption of RE increases, it will decrease CO2 Emissions. Cardoso and Fuinhas (2018) empirically analyzed the dimensions of

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energy growth, the Emission of CO2, and due to that how this is affecting the Australian environment by energy consumption in which there focus variables Coal, oil energy sector, carbon emission, and CO2 Emission by it consists of 1965 to 2015 the results indicated that the RE has a positively associated with fossil fuel because CO2 increases with the increasing consumption of fossil fuel. This implies that Australia should boost the proportion of RE and decrease the proportion of fossil fuels. Ghorbel et al. (2017) explored sustainable growth as indicated through the per capita income of people in a country. People can save their incomes when new technology increases as RE degrades the environment. He further suggests that technological change helps economies achieve sustainable growth; therefore, environmental problems can be solved by using technology and ensuring the overall reconstruction of wealth, reducing pollution. Investigated unidirectional cause found in short-run and effect relation between carbon emissions to population and RE to non-RE use, but in the long run, it comes to clear that whenever there is an increase in population, it will increase carbon emissions, Proliferation of energy contain a high level of CO2 emissions in the environment which causes of pollution, the need the energy increase because of emerging economies and these effects were reflected the need of using RE. It could be used as an alternative source.

Gupta et al. (2019) analyzed some barriers that significantly impact the development of RE. They found that social and regulatory barriers directly affect the development of RE. Breaking these barriers will enable organizations to invest in developing new technologies which were less harmful to the environment and increase the usage of RE further with less tariff energy solutions will be available for local people

Isik et al. (2017) examined the study of linear and also for non-linear relationships between tourism demand, RE consumption, and GDP (growth) by investigating a sample data of GDP and tourism, which he obtained from the World Development Indicators (data.worldbank.org. The annual data consists of 1995 to 2012; further, the sample consists of 126 country and yearly base observations. They used the variables GDP, Economics Growth, a tourist traveling, and RE consumption. Results of the study indicate that the obtained analysis shows that there are 2-way cause and effect relationships between RE and GDP (growth) in countries like T-7 (51.59–66.11). One way called unidirectional causal relation to exist from RE consumption to GDP (growth) in Spain (6.13) and exist from GDP (growth) to RE consumption in China (4.23), Turkey (5.96), and Germany (2.54) was found, further show that there is a causal relation exist from tourist arrivals to GDP (growth) in the T-7 countries (31.26). Further, this study provides an investigation to Scientists and other policymakers who have frequently been working on developing RE alternatives to other sources and reducing the dependence on traditional sources of energy because this source of energy reduces the negative impact on the environment.

Kaur et al. (2016) empirically investigate the factors of economic growth when foreign investment comes in-country and how it is beneficial. The objective of this study is to find the long-run effect of direct investment FDI and the impact of foreign direct investment on GDP and to know the integration by using a sample of world bank data that was published in 2009 and the data of the reserve bank of India of 2009 the data has been collected for 34 years. The results in the table indicate that FDI and GDP per capita have a long-term relationship for both periods as the trace statistics' values and values are higher than critical values. Therefore, test results indicate that FDI Led to growth; therefore, the government and policymakers should encourage FDI to increase their GDP to increase the economic activity and give this sector more opportunities to increase the country's GDP.

Muhammad et al. (2019) revealed the variables which affect environmental quality. The studied variables, including globalization, and financial development (OECD countries), were taken as affecting variables. The data of this research is a period from 1990- to 2014. Results were generated from the utilization of standard techniques, including CUP FM stand fully modified ordinary least square and biasness eliminated by using CUP-BE. Results show that stimulated relation of energy which consumed on CO2. The studied variables of financial development and environmental quality have been negatively associated with CO2; hence, when F.D. and E.Q. increase, it will decrease pollution. Results endorsed that long-run cointegration exists, and a bidirectional relationship between energy consumption and CO2 is also present. The study's conclusion shows that energy consumption (E.C.) is the main culprit in increasing pollution. Researchers recommend that policymakers increase the other energy sources, including wind, solar, and biodiesel. Green technology can enhance environmental quality.

Research Methodology

The data of this research study were used to analyze the CO2 emissions and their determinants which include the impact of GDP (growth)s, F.D. (private sector), TO, and RE by using the time series, Secondary data of Pakistan, and the website of World Bank is the for data extracting and evaluated over Eviews 9 software for generating results. Both descriptive and inferential statistics are used to analyze data.

Sample Size and Population

This research provides the analysis of observed variables collected by the World Bank. The research data set comprises 34 yearly observations covering 1985 to 2018. Time series data is the basic data tool used in such research, which consists of the time-series order of one population. This data help to predict future consequences based on past observations. Secondary data have been utilized in this research conducted by the World Bank as an authentic source for data collection.

Research Model

$$CO2_t = \alpha o_t + \beta 1_t\,(FD) + \beta 2_t\,(GDP) + \beta 3_t\,(RE) + \beta 4_t\,(TO) + \beta 5_t\,(UP) + \varepsilon_t$$

Where CO2 is the Emission of pollution, in other words, CO2 emissions stem from burning carbon-related products and fuels. To measure its calculation, we add to assume it as the sum of CO2 emissions generated during solid, liquid, and gas use. GDP (growth) is the gross domestic product, and it is valued in term of adding both exports and imports of goods, services, and productions measured as a significant share of GDP (growth); UP stand for urban population, and it is measured as the percent of the number of population living in different cities or lives in cities, F.D. (private sector) is the development of institutions and markets it is measured as a country to country credit provided private sector by financial sector (% of GDP), RE consumption is energy produced from hydropower, solar and wind (% of total final energy consumption)

We are using $CO2_t = \alpha o_t + \beta 1_t\,(FD) + \beta 2_t\,(GDP) + \beta 3_t\,(RE) + \beta 4_t\,(TO) + \beta 5_t\,(UP) + \varepsilon_t$

WHERE:

CO2 = Carbon Dioxide
FD = FD (private sector)
GDP = GDP (growth)

RE = Renewable Energy
TO = Trade Openness
UP = urban population
Et = Standard Error

Model Hypothesis

H1: There is a significant impact of GDP (growth) on CO2 emissions in Pakistan.
H2: There is a significant impact of Financial Development (private sector) on CO2 emissions in Pakistan.
H3: There is a significant impact of the Urban Population on CO2 emissions in Pakistan.

H4: There is a significant impact of Trade Openness on CO2 emissions in Pakistan.

H5: There is a significant impact of Renewable Energy on Carbon Dioxide emissions in Pakistan.

Data Analysis

Statistical Technique

The variable's trend has been checked using the unit root test. It analyzed the stationary in a time series. The unit root test predicts the increasing and decreasing trend of the data. If the distribution shape does not shift with the shift in time, it will reflect a stationary in the data. Further to the study, long-term relationships of variable cointegration test have been performed as this test is necessary to analyze the impact in terms of its significance. It is necessary to test the regression analysis to perform the dependency analysis part of this study. In contrast, causality analysis checks the causality between dependent and independent variables.

4.2 Descriptive Statistics

The descriptive statistics are reflected in table 4.1, which shows the data set's descriptive analysis in estimations. Overall, 34 observations were used in estimations. Table 4.1 provides the mean, median, standard deviation, and minimum and maximum values. The mean represents the average values of the data; meanwhile, the standard deviation reflects how much variable value has deviated from the center point. The deviation from the middle or mean is not too high, which shows a significant correlation among variables.

Furthermore, the overall value of CO2 is 0.759588. For the standard deviation, its SD is 0.12723, whereas the mean value of FDI is 23.21108, stated with the standard deviation is 4.2190, while the mean of UP is 33.0092 and TO is 33.2455; similarly, the mean value of GDP is 4.5692. Its standard deviation is 1.8771. Last but not least, the mean value of REC is 50.5244, and its analyzed standard deviation value is 4.1852.

Table 4.2 – Descriptive Statistics

VARIABLES	CO2	FD	GDP	RE	TO	UP
Mean	0.759588	23.21108	4.569235	50.52441	33.2455	33.00921
Maximum	0.947	29.78608	7.706	58.09	38.909	36.442
Minimum	0.512	15.38607	1.014	44.276	25.306	29.344
Std. Dev.	0.12723	4.219042	1.877177	4.185247	3.506919	2.112942
Observation	**34**	**34**	**34**	**34**	**34**	**34**

Unit Root Test

Before performing other analyses, it is essential to study the stationary level in the economic variables because this test helps identify whether any variable is integrated at order 2. Furthermore, it helps to find whether results fluctuate against time or not. The augmented dickey fuller (1979) unit root test has stationary time series data analysis. The table above 4.2 represents the result of this test. All variables were stationary at the first difference, which revealed that the null hypothesis of unit root is rejected. Critical levels such as 1%, 5%, and 10% are stationary, so no further estimations will occur.

Table 4.3 –Unit Root test

Variables	I (0)	I (1)
CO2	0.2782	0.0000
FD	0.6175	0.0012
GDP	0.0126	0.0000
RE	0.7494	0.0001
TO	0.0957	0.0000
UP	0.7421	0.0000

Regression Analysis

The percentage of change in the dependent variable concerning per unit variation in the independent variable is called the regression coefficient. Regression analysis is used to determine the relationship of variables. It identifies one or more independent variable that keeps a relationship with independent variables. Table 4.3 concludes the result summary of variables, the sign of coefficient indicates the dependency sing, if coefficient has positive sign it means positive relation exist in studied variables on the other hand if sign is negative it simply means negative relationship, in table 4.3 represented RE, TO , F.D. (private sector) and UP have significant effect on CO2 Emission, but these variables impact differently in term of their signs as TO , F.D. (private sector) and UP have positive effects on CO2 Emission which concludes if any upsurge in these variable will increases CO2 emissions but on the other hands when we analyze the result of RE and GDP both have negative coefficient which means adverse effects on CO2 emissions, these results validate if there is one unit increase in RE it will decrease the CO2 Emission with the same as coefficient defined, further table 4.3 show that GDP (growth) insignificantly affect the CO2 Emission, whereas F.D. (private sector) have positive effect on CO2 emissions. These findings demonstrate that when F.D. (private sector) increases by one unit, it will increase the Emission of CO2 by 0.005640. On the other hand, a one-unit increase in RE will decrease CO2 emissions by -0.009326. The reason behind such results is that natural resource has a positive and significant influence on the ecological footprint and Pakistani economy, 60% based on agriculture.

Further results show that an increase in UP, such as increases in cities, will affect the CO2 positively; hence 1 unit increase in UP will increase CO2 Emissions by 0.053056. Furthermore, it is confirmed that independent has a jointly significant effect on CO2 Emission and that the overall model is significant prob. (F-statistics) (0.0000). The results of Adj. R2 reflects that there are 0.955870% chances that CO2 emissions are dependent on F.D., GDP, RE, TO, and UP. In other words, whenever CO2 increases, there are 0.955870% chances that the reason for the increase will be these variables. The interrelationship in the independent variable is called multicollinearity. It existed when two or more independent variables produced a relation or dependency. Its presence affects the strength/significance of a regression. The value of VIF in the table is less than 10% which validates that there is no interrelationship among GDP (growth), F.D. (private sector), Because it is found a strong relationship between CO2 Emission and GDP (growth), RE, TO, UP and F.D. (private sector) (R square 0.962557) which converted our Regression 0.9558% (Adjusted R-squared) accurate. At the same time, the amount of bias in reporting accuracy is 0.0067 (R square-Adjusted R-squared). Since the prob. The value of F.D. (private sector), UP, TO, and TO is less than 5%, which endorsed our hypothesis and indicated that the following selected independent variables affect the dependent variable.

Table 4.4 –Time series Regression (Fixed Effects)

Variable	Coefficient	T- Statistics	Prob.		
FD	0.005640	2.322910	0.0277	1.215238	
GDP	-0.003925	-1.436416	0.1620	4.848369	
RE	-0.009326	-1.984075	0.0571	17.87684	
TO	0.006863	3.635464	0.0011	2.024686	
UP	0.053056	4.633089	0.0001	27.04645	
C	-0.861731	0.659090	N/A	-1.307455	
	Adj R2	0.955870	Durbin-Watson stat		1.7332004
	F statistic	143.9597	Prob (F statistic)	0.000000	

Cointegration test

Johansen and Juselius (1990) cointegration test has been applied to estimate long-run relationships among variables. Eigen statistics is the main measurement tool for predicting cointegration. The results of Table 4.4 exemplify a rejected hypothesis because no cointegration has been found among the selected variables as prob according to the cointegration hypothesis. The value is less than 5%, indicating a significant relationship among observed variables.

Results declared a long-run relationship between CO2 emissions and their related determinants variables. Since it is confirmed that GDP (growth), UP, F.D. (private sector), RE, and TO have a significant impact on CO2 emissions, further, it has been represented that the null hypothesis related to no cointegration equation was rejected as the result of prob. Value reflects less than 5%, and it declared that a long-term relationship exists among the variables.

Table 4.5- Cointegration

Null hypothesis	Trace	5% Critical Values	Prob.	Max Eigen value	5% Critical Values	Prob.
None *	190.8982	117.7082	0.0000	73.70529	44.49720	0.0000
At most 1 *	117.1929	88.80380	0.0001	43.44722	38.33101	0.0119
At most 2 *	73.74567	63.87610	0.0059	36.04482	32.11832	0.0157
At most 3	37.70085	42.91525	0.1508	18.94104	25.82321	0.3093
At most 4	18.75981	25.87211	0.2952	15.94492	19.38704	0.1476
At most 5	2.814894	12.51798	0.8977	2.814894	12.51798	0.8977

Granger Causality Analysis

To determine whether one time series predicts another as caused by a granger causality test is considered prominent. Scholars prefer to use Granger causality analysis to determine the directions of dependent and independent variables. It is one of the prominent tests used in conducting the granger causality test. Lag one is applied for the analysis of causality. Jones (1969) considered ad hoc as one of the best methods for the statistical calculation of this analysis.

The finding of Granger causality has mentioned in table 4.5 reflect that unidirectional and long-term relationship exists among GDP (growth) to CO2 Emission, RE to CO2 emission, RE to F.D. (private sector), UP to TO in the context of Pakistan; hence result shows that all null hypothesis related to these variables are rejected (one variable does not cause other) because there is a significant impact of each of this variable on other respectively. This result represents an increase in GDP (growth), UP, and F.D. (private sector) increases in CO2 emissions.

Table 4.6- Granger causality analysis Results

Variables	LAG1		LAG 2	
Null Hypothesis	F-Statistic	Prob.	F-Statistic	Prob.
F.D. does not Granger Cause CO2	0.54324	0.4668	1.32138	0.2835
CO2 does not Granger Cause FD	1.37652	0.2499	1.51909	0.2370
GDP does not Granger Cause CO2	2.08425	0.1592	4.48672	0.0208
CO2 does not Granger Cause GDP	0.82913	0..3698	1.28894	0.2920
RE does not Granger Cause CO2	0.73825	0.3970	4.71458	0.0175
CO2 does not Granger Cause RE	5.09561	0.0314	2.31439	0.1181
TO does not Granger Cause CO2	0.00053	0.9818	1.06789	0.3578
CO2 does not Granger Cause TO	2.51968	0.1229	1.43712	0.2552
UP does not Granger Cause CO2	0.32807	0.5711	0.67245	0.5188
CO2 does not Granger Cause UP	0.00647	0.9364	0.31605	0.7317
GDP does not Granger Cause FD	4.08179	0.0524	1.25573	0.3010
FD does not Granger Cause GDP	0.11719	0.7345	0.94695	0.4004
RE does not Granger Cause FD	1.05986	0.3115	5.54968	0.0096
FD does not Granger Cause RE	0.06133	0.8061	0.85731	0.4355
TO does not Granger Cause F.D.	0.58109	0.4518	0.66119	0.5244
F.D. does not Granger Cause TO	3.37449	0.0761	1.64424	0.2119
UP does not Granger Cause FD	1.20376	0.2813	1.34070	0.2785
FD does not Granger Cause UP	0.22895	0.6358	0.07395	0.9289
RE does not Granger Cause GDP	0.50293	0.4837	0.88713	0.4235
GDP does not Granger Cause RE	0.31824	0.5769	1.09592	0.3486
TO does not Granger Cause GDP	1.13620	0.2950	0.52530	0.5973
GDP does not Granger Cause TO	5.81160	0.0223	2.97311	0.0681

UP does not Granger Cause GDP	0.01236	0.9122	0.09660	0.9082
GDP does not Granger Cause UP	0.38885	0.5376	1.67125	0.2069
TO does not Granger Cause RE	0.50124	0.4844	0.65239	0.5244
RE does not Granger Cause TO	3.60147	0.0674	1.78632	0.1868
UP does not Granger Cause RE	2.54504	0.1211	1.33806	0.2792
RE does not Granger Cause UP	0.16294	0.6893	1.16688	0.3265
UP does not Granger Cause TO	6.39883	0.0169	4.03334	0.0293
TO does not Granger Cause UP	0.04916	0.8260	0.04110	0.9598

Conclusion

The main problem is that CO2 has been damaging the climates and environments around the globe. We have to find out the way for this, incorporate certain variables, and conduct the investigation for Pakistan in this context. This study used some prominent variables considered the main component of a country's GDP (growth) economy, including all good services produced in a specific year. Hence, such economic activities also generate CO2. Still, on the other hand, some scholar considers GDP (growth) as one of the elements that overcome CO2 because they think economic activities bring new technology and environment-friendly ways of production; hence this study investigate this theory in the context of Pakistan, in the same manner, F.D. (private sector) and TO which is also part of an economy which analyzed in the same manners, in the same manner, some scholar thinks that UP is necessary for eliminating poverty but it. Still, how this affects our environment was investigated in this study. The reviews were conducted on the literature available about our variable in chapter 2, and the methodology involved in the analysis was quantitative and explanatory. The software used in the analysis was Eview's data collection from the World Bank website available data published by the World Bank. At the end of our data analysis and results, all the independent variables influenced the dependent variable (CO2 emission), and the significance level has also been determined through prob. Value

Recommendations

- Research shows that F.D. (private sector) has not only significant but also a positive relationship with the Emission of CO2, so this reveals that if more credit is given to the private sector in Pakistan, this will increase the Emission of CO2 there are many reasons behind this fact some of which includes, because the industries in Pakistan does not utilize proper way to eliminate wastage, furthermore the fuel and energy used by the industries in Pakistan are full of such components that cause the degradation of environment similarly in Pakistan there are many small companies which operate in residential areas, so their wastage, not property eliminated. Businessmen industrialists that when they earn a good amount, it is common in Pakistan to bypass environmental standards and use the cheapest energy source for more and more profits.
- So it is advised to the government officials that the check and balance over environmental issues in the context of energy sources should be implemented strict laws related to the utilization of wastage. Every organization should have a budget that must be used in an environment-friendly manner.
- The GDP has an insignificant and negative relationship with CO2. It represents the country's overall economy, which includes producing goods in companies and services in different industries and the production in the agriculture sector. The most significant part of Pakistan's economy is agriculture. That is why it is an environmentally friendly element of an economy. So the increase in agriculture decreases the emissions of CO2.
- The RE consumption has a negative and significant relationship with the Emission of CO2. This representation could be because, in Pakistan, the R.E is one of the cheapest sources of energy. The energy produced from the fuel is not enough to meet the demand, so people started using different sources of RE, which include solar, hydro energy, wind energy, and biomass energy which ultimately reduced the Emission of CO2 in Pakistan, most recent projects which results in a reduction in CO2 includes; Tarbell dam 4888 MW (1974) Neelam – Jhelum hydropower plant has the capacity 669 MW (2018), golden Gol hydropower project capacity 108 MW (2018), Patrind hydropower plant capacity 147 MW (2017) and many other small projects which reduced CO2 in Pakistan.
- TO have a significant and positive relationship with CO2 that. Increases in TO will increase CO2 in Pakistan. A large portion of Pakistan's imports Pakistan contains petroleum products; it is evident that petroleum products are the leading cause of CO2.

Future Researches

In the future, the research is advised to incorporate some variables like an intention to use CO2, strict regulations and quality control, and strict penalties for the violation. Further, the context can be more precise if researchers use other countries that reduce their CO2 by implementing such restrictions.

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