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SOCIETY FOR SCIENCE AND EDUCATION

China Pakistan Economic Corridor (CPEC): The Counter Balancer Of Momentous Energy Crisis In Pakistan

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ABSTRACT

This paper will highlight the importance of energy projects that has been covered under the CPEC. Energy is the most important and significant factor for the development and growth of the economy. CPEC is an economic Corridor which is also working as an energy Corridor for Pakistan, 30 billion dollar is invested in energy sector, which will ultimately boost up Pakistan's shut down industry due to the energy crisis. This paper will highlight the projects of energy sector that has been started in Pakistan and how these energy projects will be beneficial for the economy of Pakistan. This paper will discuss the link between electric power consumption, labor force and price ratio with GDP of Pakistan. Data has been taken from the World Bank for the period of 1990-2016, GDP is considered as dependent variable whereas electric power consumption, labor force and price ratio have been analyzed as independent variables in the light of CPEC and its effects. Least Square Regression has been applied with the help of E-Views a statistical software. The result reveals that GDP of Pakistan is highly and positively affected by electric power consumption, labor force and price ratio. CPEC will help to improve the supply of energy including electricity, increase employment rate and generate more opportunities of employment that will enhance the GDP of Pakistan. The energy projects which includes coal, wind, hydro and solar are covered under the CPEC will help the country to come out from the energy crisis that Pakistan has been facing from the last decade.

Keywords: CPEC, Energy, GDP, Electric Power Consumption, Labor Force, Price Ratio

INTRODUCTION

In order to fulfill the dream of strengthening and revitalizing his home-land, Xi Jinping, the president of China in the year 2012 announced the 'Chinese Dream', with motto of 'One Belt, One Road' (OBOR) initiative, revealed in the subsequent year. It comprised the linkage of China to Europe, Persian Gulf and the Africa through the ways of new sea means and land. The Huge, in broader perspective, therefore has been considered both as an essential part of OBOR and as the foundation of China's struggles to revive and make deeper its strategic co-operation with Pakistan. Announcement is followed by the implementation of this great plan, the very first initiative was the dialogue with Pakistan, the old and very faithful neighboring companion of China. Negotiation with Pakistan is completed successfully and plan is announced with the name of "CPEC" i.e. the China Pakistan Economic Corridor.

Likewise OBOR (One Belt, One Road), CPEC (China Pakistan Economic Corridor) was also launched with great fanfare and greet by the officials of China. It was also being considered as the way to prosperity and affluence, not just for China but for the rest of the world. The bragging surrounding the introduction of the CPEC thus highlights the image of a confident, positive China which has the ability to reshape the economic and geopolitical scenario of Europe and Asia for its benefits, and of a relationship between China and Pakistan which is strengthening more and more with the passage of time. Yet, the propensity to regard China's rise as unavoidable, which seems to have become the traditional view in certain foreign policy rings, masks the nation's weaknesses and dependent-ability and dismisses the degree to which they lead and constrain its external behavior. More precisely, it have a tendency to make a one-sided picture of the roots, determinations, and scenarios of the CPEC - not to highlight of the Sino Pakistan affiliation itself. China-Pakistan Economic Corridor is a mega project of USD 45 billion. The economic corridor is about 3000 Km long consisting of highways, railways and pipelines that will connect China's Xinjianghe (Sheengjaang) province to the rest of the world through Pakistan's Gwadar port.

From the Stone Age to the supersonic energy has played a major role in taking man. Energy is crucial to all economic activities of a country like infrastructure, transport, information, agriculture, industry, communication, residential uses and others. Economically the energy is costlier factor. However, a robust energy supply system is the essential factor for the nation that want to improve and upgrade the living standards. The rise of incomes is followed by rise in increase of use of energy. As more countries and as more countries develop their economies and rise out of poverty, energy demand rises proportionately. For fast developing countries the supplies of energy are now less trusted due to volatility in prices. So to make sure availability of energy in low cost becomes very imperative.

Coal is one of the cheapest mean of energy but these days it becomes dangerous for the climate of the world. Though, rapid growing economies, have found low-cost natural gas as best alternative. A multidimensional approach will be required to meet the challenge that domestic supplies fall short of demand. In this regard, Increment in resource efficiency and productivity will be the critical task. Expansion of innovation is also in progress. Globally, the world is shown a tremendous growth in the use of wind and solar power. Fossil fuels are the dominant means of energy.

Since independence, the electricity sector in Pakistan is remained inefficient. Technological, political, economic and organizational machinery problems are the dominant factors of backwardness of this sector. Like treatment was given to other sectors of economy with the same consequences. Throughout the period a mismatch has been observed between demand and supply, tariffs and efficiency of electric energy in Pakistan.

LITERATURE REVIEW

For the purpose of this research enough literature has been reviewed, (Calabrese, 2014)during the past decade China intends influence Pakistan's geographical advantages to counter balance international pressures which is aiming its stability. It is a clear fact that China-Pakistan Economic Corridor (CPEC). Is the most ambitious recent effort by China to strengthen and augment its energy, expand its strong, longstanding, resilient, robust and strong strategic bonds with Pakistan, Unveiling a $46 billion infrastructure spending plan by President Xi Jinping during his April 2015 visit to Pakistan, aimed at bringing this megaproject to fruition, was in this sequence. (Spokesperson China's Foreign Ministry, April 15,2015)said, Being a substantial part of the current economic cooperation between China and Pakistan. The China-Pakistan Economic Corridor as a pragmatic mutual cooperation, is expected to cover various

fields, deepen the integration of interests of the two countries and boost common developments.

The most important role of CPEC is power generation. $33 billion dollars will be invested in energy sector related projects. Pakistan is losing approximately 2.5% of its annual GDP, due to a shortfall of 4,500 MW electricity. The power generation projects, will be developed between 2018 and 2020 as preferred fast-tracked "Early Harvest" plan. (Deloitte) To help Pakistan to overcome its stubborn energy crises. CPEC scheduled energy projects will be built by private entrepreneurs and not by the governments of either China or Pakistan. The Exim Bank of China will finance these private investments at a nominal interest rate of 5–6%, while the Government of Pakistan will be contractually obliged to purchase electricity from these Independent Power Producers at agreed rates. (CPEC Offical Website)**.**

Huge amount of energy has been used in the previous decades to upgrade the life style of the people. After the revolution in industry .i.e. known as "industrial revolution" economy of the world and consumption of energy showed a rapid growth (Tang, , Gong, Xiao, & Wang , 2017)**.** (Razzaqi, Bilquees, & Sherbaz, 2011)As already stated, it is universally held that Energy is an essential factor to economic growth and also it has a potential role of a restraint factor to curb economic growth, as other factors of production cannot work properly without energy. It can be well contended that the impact of energy use on growth depends on the economic structure, energy intensity and the phase of economic evolution of the country.

(Aqeel & Butt, 2001)**,** *find the positive link between economic growth, energy consumption, and employment in Pakistan and determined the result that economic growth is the reason of total energy consumption.* (Kakar & Khilji, 2011)**,** determined for Pakistan the link between total energy consumption and economic growth from 1980-2009.By using Johansen Co-integration, they established that for economic growth energy consumption is vital and any energy shudder may upset the Pakistan's economic development in long-run. (Ahmed, et al., 2013)Studied the bearing of economic growth and energy consumption of Pakistan by using the data of period 1975 to 2009. The results of the test confirmed that in Pakistan there is a positive relationship between energy consumption and GDP. In 1978, (Kraft & Kraft, 1978)utilize the data of 1947 to 1974 of the United States of America and summarized that GDP determined energy consumption. (Stern & D.J., 2000) used the series of data from 1948-1994 and concluded that GDP of the country is significantly influenced by consumption of energy.

Oh and Lee Used the Korea's seasonal series of data from 1981-2004, they applied Grander Causality Test between three demand variables (GDP ,energy consumption and price)and four supply variables (GDP ,energy consumption, labor and capital),the results indicated the unidirectional long term causality between GDP and consumption of energy. (Oh & Lee, 2004) . (Hunt, L.C., & Y. Ninomiya, 2005)Formulate the relationship between energy price, GDP and per capita energy consumption with the help of ARDL model.

Although, some researchers determined no relationship among economic growth and energy consumption. (Yu & Jin, 1992) did work on US seasonal data 1974 to 1990 and expressed no connection. (Yu, & Hwang, 1984) and (Akarca & Long, 1979) also drew the similar results.

METHODOLOGY

World Bank and official website of CPEC are the main sources of utilized data to investigate the relation of growth & energy and to highlight the importance of energy projects of CPEC, data includes annual consumption of electric power, labor force and price ratio with GDP of

Pakistan for the period 1990-2016 and details of energy projects. We use correlation and least square regression method with the help of E-Views.

Descriptive Statistics

	LOGGDP	EPC	LF	PR
Mean	6.545915	400.0042	17.64575	0.219173
Median	6.334335	400.0042	17.63982	0.197971
Maximum	7.291788	486.7914	18.03567	0.28632
Minimum	5.917744	277.3531	17.25048	0.172361
Std. Dev.	0.45868	60.24097	0.255551	0.039659
Skewness	0.332532	-0.16434	-0.02203	0.598564
Kurtosis	1.525844	1.944691	1.622532	1.769063
Jarque-Bera	2.942377	1.37442	2.13678	3.316863
Probability	0.229652	0.502977	0.343561	0.190437
Sum	176.7397	10800.11	476.4354	5.917672
Sum Sq. Dev.	5.47006	94353.33	1.697959	0.040893
Observations	27	27	27	27

Descriptive statistics shows that 27 observations are analyzed and found positive mean of all variables which are LOG-GDP 6.545915, Electricity Power Consumption (EPC) 400.0042, Labor Force (LF) 17.64575 and Price Level Ratio (PR) 0.219173. GDP has been transformed into log to make a normal skewed distribution. EPC has the highest maximum & minimum values that is 486.7914 and 277.3531 respectively whereas PR has lowest maximum & minimum values 0.28632 and 0.172361 respectively. The highest standard deviation is of EPC that is 60.24097 and PR has lowest standard deviation that is 0.039659. All variables have Kurtosis less than 3 whereas p-value of Jarque-Bera shows the normal distribution of all variables having p value more than 5%.

Correlation Of Variables

	LOGGDP	EPC	LF	PR
LOGGDP	1	0.810194	0.969521	0.949524
EPC	0.810194	1	0.855633	0.64796
LF	0.969521	0.855633	1	0.854275
PR	0.949524	0.64796	0.854275	1

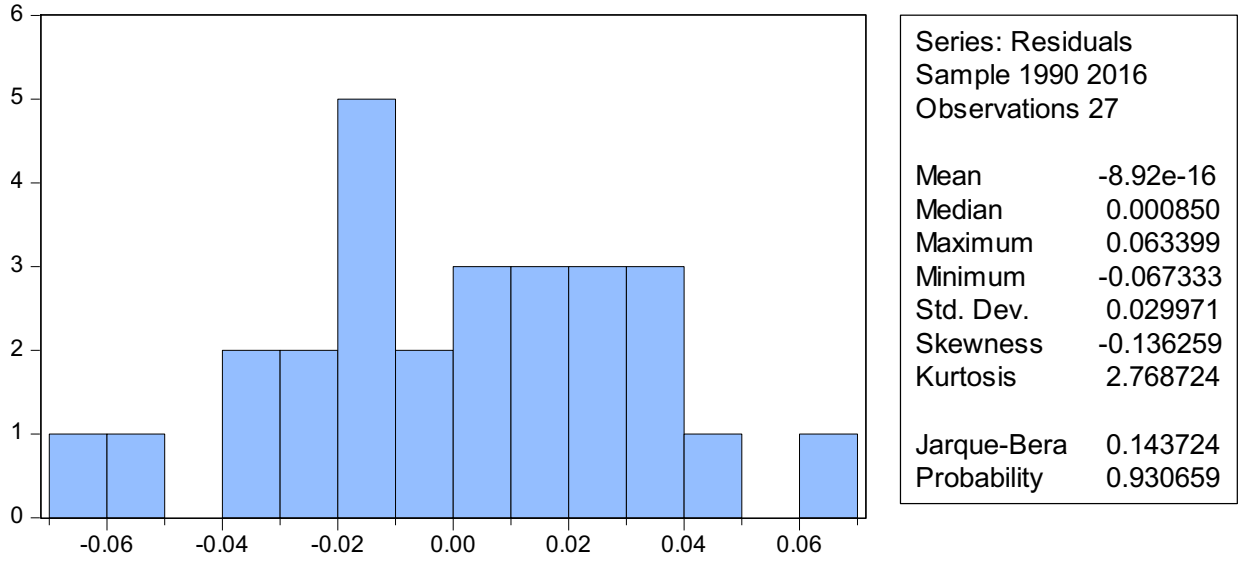
Correlation of variables shows the degree to which they are associated with each other. Above table shows that GDP is correlated with EPC 81% whereas with LF 96.9% and with PR 94.9%. The correlation shows that all independent variables are interrelated with dependent variable positively and highly significantly. GDP is affected by EPC, LF and PR due to high relativity.

Least Square Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-10.82326	1.167585	-9.269781	0
EPC	0.000562	0.000211	2.666711	0.0138
LF	0.903854	0.072778	12.41934	0
PR	5.453405	0.318676	17.11268	0
R-squared	0.995731	**Mean dependent var**		6.545915
Adjusted R-squared	0.995174	**S.D. dependent var**		0.45868
S.E. of regression	0.031865	**Akaike info criterion**		-3.91865
Sum squared resid	0.023354	**Schwarz criterion**		-3.72667
Log likelihood	56.90172	**Hannan-Quinn criter.**		-3.86156
F-statistic	1788.04	**Durbin-Watson stat**		0.586994
Prob(F-statistic)	0			

The regression result shows that all independent variables are significant having p value less than traditional 10% level of significance that are EPC 1.38%, LF 0% and PR 0%. EPC, LF and PR have positive effects on LOG-GDP. R-square is the coefficient of variance that shows the portion of reliability of GDP due to electric power consumption, labor force and price ratio that is 99.57%. The result reveals that GDP relies and changes 99.57% due to explanatory variables. p-value of F-statistics is also significant that shows that independent variable is effective for population as well.

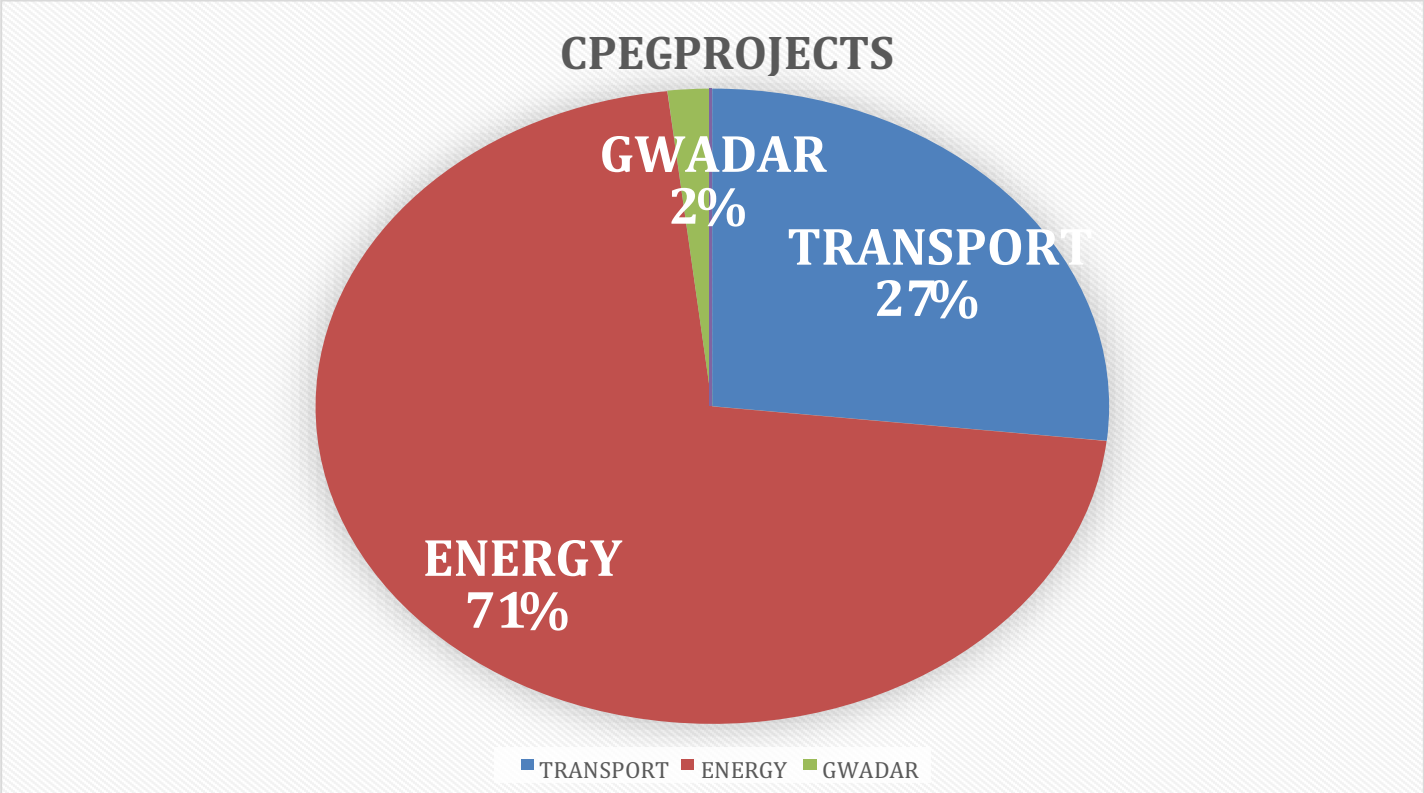
Normality Test



We can observe from the above table that the overall mean is -8.92e-16, the max value is 0.063399, min value is -0.067333 whereas skewness of the data is -0.136 with the kurtosis 2.768724 & Jarque Bera is 0.143724 that shows the variables are normally distributed.

Projects Cost

PROJECTS	COST MILLION($)
Transport	12363
Energy	33043
Gwadar	792.6
Fiber cable	44
TOTAL	46242.6



CONCLUSION

From the above statistical analyses, we found that there is a strong association of electric power consumption (EPC), labor force (LF) and price ratio (PR) with GDP consumption. The table of correlation shows that GDP is related with EPC 81% whereas with LF 96.9% and with PR 94.9%. It means their reliability is very highly dependent. Based on our data, the table of least square regression analyzed that GDP of Pakistan relies 99.5% on the electric power consumption, labor force and price ratio. These results described that due to increased electric power consumption, labor force and price ratio the growth of Pakistan changes positively. There will be some other factors as well that affects the GDP of Pakistan but here we have focused mainly on use of electricity, labor force and price ratio in the broad view of CPEC. The 27 years' statistics shows and supports the concept that economic growth of Pakistan relies on variables that will affect during the development of CPEC. Our result elaborates that CPEC will be very fruitful for the economic growth of Pakistan as so many projects will contribute to meet the demand of energy and electricity whereas the employment rate will also increase that leads to enhance the labor force and due to high productivity, price ratio will be affected as well. CPEC will help industries to reopen the shutdown units and stabilize the existing ones, it will induce more investors throughout the country and internationally as well that will improve the GDP of Pakistan.

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APPENDIX

Years	GDP Per Capita (current US$)	Consumption (kWh per capita)
1990	371.57	277.53
1991	410.47	297.57
1992	427.57	334.27
1993	440.92	335.38
1994	433.28	345.95
1995	493.66	358.59
1996	502.78	360.15
1997	483.65	363.67
1998	470.24	344.88
1999	465.07	356.81
2000	533.86	373.13
2001	510.65	379.04
2002	499.86	385.8
2003	563.59	411.07
2004	649.8	430.57
2005	711.46	464.72
2006	873.77	488.56
2007	950.43	482.68
2008	1039.31	444.19
2009	1006.6	460.29
2010	1040.14	466.57
2011	1226.21	456.67
2012	1261.2	451.69
2013	1272.44	449.96
2014	1316.98	471.4

ENERGY PROJECTS COVERED UNDER CPEC

S.NO.	PROJECT NAME	MEGA WATT (MW)	Estimated Cost (US$ M)
1	Port Qasim Electric Company Coal Fired, 2x660, Sindh	1320	1,980
2	Sahiwal 2x660MW Coal-fired Power Plant, Sahiwal, Punjab	1320	1,600
3	Engro Thar 4x330MW Coal-fired, Thar, Sindh	1320	2,000
3A	Surface mine in Block II of Thar Coal field, 6.5 metric ton per annum (mtpa), Thar , Sindh		1,470
4	Gwadar Coal /LNG / Oil Power Project, Gwadar	300	600
5	HUBCO coal power plant 1X660 MW, Hub Balochistan	660	970
6	Rahimyar Khan Coal Power Project, Punjab	1320	1,600
7	SSRL Thar Coal Block 1 - 6.5 metric ton per annum(mpta) Thar, Sindh		1,300
7A	SSRL 2×660 MW Mine Mouth Power Plant,Sindh	1320	2,000
8	Zonergy 900MW Solar Park, Bahawalpur, Punjab	900	1,215
9	Dawood 50MW wind Farm, Bhambore, Sindh	50	125
10	UEP 100MW wind Farm, Jhimpir, Sindh	100	250
11	Sachal 50MW Wind Farm, Jhimpir, Sindh	50	134
12	Suki Kinari Hydro power Station, KPK	870	1,802
13	Karot Hydropower Station, AJK & Punjab	720	1,420
14	Matiari to Lahore Transmission line		1,500
15	Matiari to Faisalabad Transmission line		1,500
16	Gaddani Power Park Project (2×660MW)	1320	3,960
16A	Gaddani Power Park Project (Jetty + Infrastructure)		1,200
17	HUBCO Coal Power Plant 1X660 MW, Hub, Balochistan	660	970
18	Kohala Hydel Project, AJK	1100	2,397
19	Pakistan Wind Farm II 2X50 MW(Jhampir, Thatta, Sindh)	100	150
20	Thar mine mouth oracle, Thar Sindh	1320	1,300
21	Muzaffargarh Coal Power Project, Punjab	1320	1,600
		16070 Mega Watt	**33043 Million**