

# **Does Infrastructure Development Promote Regional Economic Integration? CPEC's Implications for Pakistan**

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## **ABSTRACT**

Regional integration is a dominion scheme between countries to promote steady growth, macroeconomic cooperation, connectivity and peace through common institutions and rules. The concept of regional integration is multidimensional. However, the key attribution is economic or trade integration. CPEC is the emerging agreement between China and Pakistan. The benefits associated with CPEC have become hot cake of discussion for researchers. CPEC includes flow of capital, ICTs, manpower and construction of mega infrastructure. Based on existing studies, infrastructure contributes towards growth. But is infrastructure development encourages regional economic integration besides CPEC, is our question of interest. For this purpose, this study employs the data for Pakistan's economy from 1972-2014. Trade liberalization is used to indicate the regional economic integration (REI). An infrastructure index based on multiple indicators has been constructed through PCM. Empirical results indicate that well developed infrastructure significantly and positively contributes towards REI. Also polity index (a measure of democracy) and FDI are positively and significantly affecting REI where REI is significantly and negatively associated with inflation and exchange rate. This study confirms the proposed positive outcomes associated with CPEC due to infrastructure development in Pakistan. In addition, the study provides an insight to the challenges regarding CPEC and proposes some policy implications to improve the situation in Pakistan.

**Key Words: Infrastructure, Regional integration, CPEC, Pakistan, China**

## **1. Introduction**

The friendship knot between China and Pakistan has been tied long ago and since then they are all weather supporters. They not only share common geographical borders but also Karakorum Highway that connects Kashgar to Islamabad. The common name for Karakorum Highway is China-Pakistan Friendship Highway (completed in 1979). Since 2000, this highway is continuously renovating and extending to improve traffic. Further, an internal route of roads also bridges the Karakorum Highway to Gwadar port and ports of Karachi in Pakistan (Ali, 2015).

China-Pakistan Economic Corridor (CPEC) was first discussed by the premier of China Li Keqiang in 2013 when he visited Pakistan (Tiezzi, 2014). Pakistan welcomed it. CPEC would link up China and Pakistan to Gwadar port (Pakistan) to Kashgar (China) through railroads, roads, gas and oil pipelines and links of optical fiber. In turn, Gwadar port would be fully functional with a central deep water functional port in the sea. Once the construction is completed, it would be the main entrance for the trade between China, Africa and Middle East. It would reduce the 12000 Km. oil supply route from Middle East to China (South China Morning Post, 2014). Besides, it included the construction of mega physical infrastructure (like rail roads from Gwadar to Khunjrab with the potential connection to not only China but with India, Iran and Afghanistan to Karachi to Lahore motorway and 2700 KM highway from Kashgar to Gwadar). This network of physical infrastructure would promote the regional connectivity, economic integration and formation of favorable economic zones (China Daily, 2013).

The projects employed under CPEC would be implemented in three phases; short-term, mid-term and long-term carried out by 2017, 2025 and 2030 respectively (Jawad, 2013). CPEC has a special focus on meeting high energy demand in China and Pakistan. More than 21000 MGW of energy is expected to be produced. In this regard, an Energy Planning Working Group has been laid for the immediate enforcement of power projects included in CPEC (Pakistan Today, 2014). Through CPEC, China is committing its biggest foreign direct investment of 46 billion dollars in Pakistan. According to Stevens (2015), it is nearly 20 % of GDP of Pakistan's economy. Roughly, \$12 billion would be spent on constructing transportation infrastructure and rest of \$34 billion would be spent on producing electricity (Shah, 2015). Not only a better link up

with the neighboring economies would be there but Pakistan would have ample energy supplies to meet its own mounting demands. The Gwadar port then would serve as a connected headquarters for China to increase its regulation in the region. Besides, it would weaken the growing influence of USA in Asia (Abid and Ashfaq, 2015).

As soon as this corridor is completed, China would be connected to Africa, Middle East, and Europe. Or in other words, China would be able to access these regions of huge markets and oil. Furthermore, CPEC would allow the domestic investors and businessmen of China to invest in Pakistan as well as in world economy through Pakistan. Technological advancements in China can be further helpful by tracing and excavation the beneath resources of these regions (particularly Afghanistan). These discoveries would benefit the entire neighborhood (Irshad and Xin, 2014).

According to Kanwal (2016), Asian Development Bank (ADB) forecasts that to bridge the gap of infrastructure by 2020, an investment of 8 trillion dollars is required in Asia. Specifically, the physical infrastructure development would allow the central Asian economies to connect and improve trade. The essence of an old Chinese proverb is that one must first construct roads to become rich. The message between the lines is quite clear. The whole scheme of CPEC is not only construction of transportation infrastructure (railroads, ports and highways), energy infrastructure and developing telecommunication but it evolves the integral physical infrastructure for the development of whole region (Hali et al., 2015). The current study seeks the significance of CPEC by finding the answer of this question that whether regional economic integration can be promoted through improved infrastructure in Pakistan or not. The rest of the paper is organized as: Section 2 deals with challenges related to CPEC. Section 3 covers a brief review of literature. Section 4 consists of model specification and result discussion where section 5 concludes the study with brief policy recommendations.

## **2. Challenges Related to CPEC**

The efficient implementation of CPEC is a real challenge in Pakistan. There are many internal as well external elements which are in constant opposition of implementation of CPEC. According to Luan Jianzhang (The Vice Director General of Policy Research Office at the

International Department of the Central Committee Communist Party of China), unstable political government, poor administration and institutional performance and terrorism are the major hurdles. With the successful completion of CPEC, Pakistan would become the hub of major economic activities in the whole region. Due to this, the opponents like US, India and Israel are in state of unrest (Abid and Ashfaq, 2015). There is also constant remonstrations by many political parties within Pakistan (like Baloch Nationalists, BRP and APN). Some of the major challenges are enlisted below.

### **2.1. CPEC and Baluchistan**

Balochistan is the province of great potential naturally. Through CPEC, a trade route would connect the Gwadar port with Kahgar in China. Balochistan has remained a disputed territory since beginning due to Baloch insurgents, political economic attitudes of leaders and ethnicity. Local insurgents were always insecure regarding the development of this province. They show their hostility time and again by kidnapping and attacking the Chinese engineers and blowing gas pipelines (The Express Tribune, 2016). The reason behind their aggression is the insecurity to see Baluchistan as a developed province. If this province would be developed and stable, the outsiders would be in and the hold of these militants would be weakened. As it is quite clear that not only China and Pakistan but the whole region would benefit from CPEC, the interest of Baloch would certainly increase. Since independence, Baloch insurgents have taken the development actions as curse and threat to their sovereignty (The Daily Times, 2015). Besides, there is much political oppression regarding CPEC. In fact the chair of Baloch Republican Party (BRP), Brahamdagh Bugti has demanded a UN sponsored referendum in Baluchistan to decide the CPEC construction and completion. The kidnapping and killing of Chinese engineers in Balochistan is very common. By doing so, these militants are creating a frightening atmosphere for foreign investors (The Express Tribune, 2016). The challenge of unfriendly behavior of Baloch community must not be entertained at the stake of a big investment opportunity as CPEC.

## **2.2. CPEC and KPK**

There is a conflict between two major provinces of Pakistan over CPEC; Punjab and KPK. This undesirable situation arises when the federal government has made changes in the proposed route for CPEC. The political parties of KPK have argued that changes in the route of CPEC would turn all economic gain towards Punjab province only. They have demanded to stick to the original route of CPEC otherwise, the nation would be parted (The Dawn, 2015). Sikander Sherpao (parliamentary leader of The Qaumi Waten Party), has proposed a resolution to stay with the original route of CPEC. The essence of this resolution is that if the routes are modified, it would be unjust as the province (Baluchistan) has already borne enough damage due to terrorism (Bureau Report, 2015). They have convinced of the view that the proposed route would boost the economic activity in rural areas of FATA and KPK and if the changes were made, these areas would remain underdeveloped (Staff Report, 2015). Absence of political cooperation between the provinces of Pakistan would certainly affect the efficient implementation of this billion dollar project. Pakistan needs serious measures to take care of this conflict for the successful implementation of CPEC.

## **2.3. Tax and Tariff Issues**

There exist anxiety held by China over the tax and tariff implementation of power projects under CPEC. China has serious concerns over detaining the implementations by FBR. The issues aroused due to the delay in approval from FBR on the tax relief of imported machinery and instruments. This exemption is a part of agreement of CPEC. This delay is shedding negative effects on the due completion of the project (Business Recorder, 2015). In addition, china has also reservations over the issue of reduction in tariff on renewable energy. According to the sources, this decrease in tariff would have adverse effects on the efficient implementation of project. In this regard, Pakistani authorities are trying to resolve the issue through the reviews of NAPRA which determines the tariff on fuel independently (Business Recorder, 2015).

## **2.4. CPEC and India**

India is highly uncomfortable with the initiative of CPEC in Pakistan. As soon as the corridor is completed, Pakistan would be the center of trade in whole region. Many other Asian countries are interested to become a part of CPEC in order to benefit from duty free economic zones. As India has open opposition for Pakistan, it has tried to pressurize the Chinese president to retreat the plan of CPEC. Also India is unhappy with the development of Gwadar port. According to the resources, India would do everything for the failure of Gwadar port. Also the geographic expedition of Baluchistan is keeping India in continuous pain. In this regard, India has taken the initiative of developing Chabahar port with the collaboration of Iran to compete Pakistan (Bhutta, 2015).

## **3. Literature Review**

Construction and development of CPEC is expected to improve cross border physical infrastructure where cross border infrastructure availability tend to decrease transportation cost, raise the trade volume, increases regional integration and free movement of labor force. Reduced cost attracts foreign assistance which further promotes trade and growth. The Gravity equation of bilateral trade by Tinbergen (1962) stated that trade volume is positively affected by the size of two economies (size is usually measured by GDP of each country) and inversely related to the distance between them. This equation is the most robust empirical finding in the literature of international trade. The current initiative of CPEC is somewhat related to this equation. The improved infrastructure services would lead to increase trade and improved export performance by reducing distance and as a result, lowering transportation cost. Bougheas et al. (1999) have investigated the impact of infrastructure services on trade in European countries. The study has used hybrid Ricardian model of trade by including infrastructure and transportation cost. The study has observed cost reductions due to efficient infrastructure provision. The results of the study suggest that trade volume is rising over time as infrastructure services are improved.

Empirical literature supports the view that provision of transportation and other physical infrastructure can enhance the export performance as well as overall trade. Inability of poor physical infrastructure services is responsible for reduced trade volume due to reduced market

access and increased transportation cost. In the economies of both coastal and landlocked boundaries, inadequate infrastructure services is accounted for 40% and 60% of increased costs respectively (Limo and Venables, 2001). Clark et al. (2004) has investigated the relationship of infrastructure and shipping cost for explaining the market access, increased trade volume and income per capita in US economy. The study analyzes a huge data set and state that port efficiency, distance and trade volume are important factors for shipping cost. Among all, port efficiency is important. Increased efficiency of port tends to lower down the shipping cost by 12% where lower shipping costs associated with improved infrastructure would increase the trade volume by 25%.

According to Ndulu (2006), investment in physical infrastructure is the big push of growth and increasing regional integration in African economies. The study has investigated the role of public physical infrastructure for increased regional integration and how these two interact to contribute toward growth. This study stresses the availability of basic physical infrastructure by public sector. Further, this study suggest that improved trade and trade volume is the indicator of increased economic integration. This process of regional integration can be smooth with the provision of necessary public physical infrastructure. Both improved infrastructure and regional integration would then support a friendly environment for growth in Africa.

Edmonds and Fujimura (2006) have analyzed the effects of cross border transport infrastructure on volume of trade and FDI in Greater Mekong Sub-region (GMS). Panel data analysis has been conducted for the time period 1981-2003. A modified form of Gravity equation has been used for the empirical analysis. Empirical results suggest a direct and significant impact of cross border transportation infrastructure on intra-regional trade. In addition, when domestic infrastructure was analyzed separately for the trade, it is also positively contributing towards trade volume. Together, when both cross border and domestic transportation infrastructure are analyzed for trade, impact of cross border infrastructure is positive and of local infrastructure is negative on trade whereas the impact of infrastructure on FDI is inclusive.

Francois and Manchin (2007) have analyzed the impact of institutions, infrastructure, colonial and geographical background on trade patterns by using panel data. A comprehensive measure for infrastructure is used by taking into account different indicators. These indicators are combined through PCM. The results of their study suggest that export performance and trade openness is highly dependent on the quality of institution and the availability of developed infrastructure. According to them, this dependence is core for higher growth and development as well.

According to Bhattacharyay (2008), infrastructure can contribute towards the regional economic integration by number of ways. For instance, it can facilitate the process of economic exchange both domestically and internationally. Also, it can increase the access towards the key elements of growth like technology, education and resources. Infrastructure provision can improve economic as well as environmental conditions i.e. fulfilling the public utilities of electricity, transportation, water and sanitation and telecommunication through environment friendly technology with lower cost. It can increase physical connectivity of both within and between countries. Further, better connectivity supports the process of regional integration through expansion in market size, international trade and foreign investment. Iwanow and Kirkpatrick (2009) have used an extended gravity equation for African countries. They have highlighted the determinants of export performance and conclude that transportation and communication are core for export performance.

Economic literature supports the view that availability of improved domestic infrastructure services leads to a prosperous economy (Canning and Pedroni, 1999; Fan et al., 2002; Esfahani and Ramírez, 2003; Seethepalli et al., 2008 and Raihan, 2011). But cross border infrastructure facilities also encourage trade, FDI and economic growth. According to Miesner (2009), quality infrastructure improves the regional economic integration (REI). It facilitate the process of REI by removing the technical barriers to trade, increasing competition, safeguarding the interests from other regional blocks, reducing the trade disputes, increasing technological exchange and protecting socio economic standards.

Shenglonga and Angangb (2011) has tested the Gravity equation for the Chinese economy. Their study includes the impact analysis of transportation infrastructure on economic integration and growth. Regional economic integration is measured through trade openness. The results of the study indicate that a well-developed transportation infrastructure has positively contributed not only towards increased regional integration but also growth of the economy.

According to United Nations Conference on Trade and Development (UNCTAD), trading cost is the key factor when it comes to the trade barrier in intra-Africa trade even it is important than tariffs (UNCTAD, 2009 and Balistreri et al., 2014). The economic literature on both regional economic integration and the impact of physical infrastructure on trade, poverty reduction and economic growth has indicated absence of necessary infrastructure as cross border constraints to international trade where provision of efficient infrastructure services is enhancing growth, regional economic integration and reducing the cost of trade (Jouanjean, 2015).

Pakistan and China are strong trading partners despite the cultural and ideological differences. These trade relations extended over four decades. Both countries have signed and implemented numerous trade agreements (like Bilateral Trade Agreement, 1963; FTA, 2006 and FTA for Trade in Services, 2009). Moreover, the magnitude of trade between China and Pakistan is continuously increasing. In 2007, trade volume was of worth \$4.1 billion but it has reached to \$9.2 billion in 2013. That is a rise of 124% in trade volume. Besides, the exports of Pakistan have risen 400% from 2007 to 2013 (Economic Survey of Pakistan, 2014). The two nations are looking forward to further fortify their trade relations through the initiative of CPEC. Empirical literature shows that REI (trade) is strongly affected by availability of infrastructure services. The current study analyzes this effect for Pakistan's economy. For this insight, trade liberalization is used to indicate the regional economic integration (REI). For physical infrastructure, a composite index (constitute of transportation, telecommunication and energy) has been constructed. Each component of physical infrastructure has been measured by multiple indicators and combined through PCM. Effect of other factors on REI like foreign assistance, exchange rate, inflation and political regime has also been analyzed.

#### 4. Model Specification and Empirical Analysis

The present study has used trade openness as an indicator of regional economic integration. Since the development of physical infrastructure is core in CPEC, this study tries to access the expected effects of CPEC by using a composite infrastructure index. Following specified model is used:

$$TO = f(\text{POLITY2}, \text{INF}, \text{FDI}, \text{EXR}, Z)$$

Where TO is trade openness and a measure of REI. POLITY2 is measure of democracy indicates the political regime of a country. INF represents inflation rate measures the investment environment. FDI represents Foreign Direct Investment measures the foreign assistance. EXR is the exchange rate and Z is the measure of physical infrastructure which is a composite index of physical infrastructure. The time period is from 1972 to 2014. Time series data has been used for economy of Pakistan. Data has been collected from various issues of Pakistan Economic Survey and WDI (2016).

The stationarity doctrine is important while analyzing the time series data. In order to check for the unit root, this study has employed ADF test. The test results are reported in Table-1.

**Table-1.ADF Test Statistics**

<b>At Level</b>				
<b>Variables</b>	<b>Without Trend</b>	<b>Prob. Values</b>	<b>Trend and Intercept</b>	<b>Prob. Values</b>
<b>TO<sub>t</sub></b>	<b>-1.629991</b>	<b>0.4554</b>	<b>-1.824161</b>	<b>0.6677</b>
<b>POLITYII<sub>t</sub></b>	<b>-1.875622</b>	<b>0.3402</b>	<b>-1.947806</b>	<b>0.6120</b>
<b>INF<sub>t</sub></b>	<b>-2.180714</b>	<b>0.2163</b>	<b>-2.145264</b>	<b>0.5047</b>
<b>FDI<sub>t</sub></b>	<b>-1.786549</b>	<b>0.3814</b>	<b>-2.790584</b>	<b>0.2093</b>
<b>EXR<sub>t</sub></b>	<b>1.394499</b>	<b>0.9987</b>	<b>-0.617595</b>	<b>0.9725</b>
<b>Z<sub>t</sub></b>	<b>-1.488692</b>	<b>0.5295</b>	<b>0.338569</b>	<b>0.9982</b>
<b>First Difference</b>				
<b>Variables</b>	<b>Without Trend</b>	<b>Prob. Values</b>	<b>Trend and Intercept</b>	<b>Prob. Values</b>

$\Delta TO_t$	-4.011081* **	0.0036	-4.145457 ** ***	0.0122
$\Delta POLITYII_t$	-6.115735* **	0.0000	-6.150539* **	0.0000
$\Delta INF_t$	-3.552356**	0.0135	-3.873238**	0.0261
$\Delta FDI_t$	-3.849284**	0.0055	-4.107617**	0.0134
$\Delta EXR_t$	-2.702080***	0.0825	-3.772895** ***	0.0286
$\Delta Z_t$	-2.833240***	0.0627	-6.088276*	0.0000
Note: * denotes 1% significance level** stands for 5% significance level and*** shows 10 % significance level				

The unit root (non-stationarity) exists at level as reported in Table-1. At first difference, all variables become stationary. It is clear that all variables are of I (1) that is the order of integration is one. In order to determine the existence of long run relationship, we have applied Johansen co-integration technique. But first, we need to determine the optimal lag length. Optimal lag length is determined by different criteria which are presented in Table-2.

**Table-2. Selection Criteria for VAR Lag Order**

Lag	Log L	LR	FPE	AIC	HQ
0	-1389.971	NA	8.29e+22	69.79854	69.89014
1	-1142.340	408.5902	2.15e+18	59.21702	59.85819
2	-1115.143	36.71587	3.78e+18	59.65717	60.84793
3	-1045.299	73.33617*	9.89e+17*	57.96497*	59.70531*

\* indicates lag order selected by the criterion

According to the results reported in Table-2, optimal lag length for the VAR processes is three as suggested by multiple criteria. In order to check for the existence of long run relationship, Johansen co-integration has been applied on desired variables and results are reported in table Table-3.

**Table-3.Unrestricted Co-integration Rank Test (Trace and Maximum Eigen Value)**

$H_0$	$H_1$	Trace Statistics	Critical Value At 5% level	Probability <sup>a</sup>	Max-Eigen Statistics	Critical Value At 5% level	Probability <sup>a</sup>
$r = 0^*$	$r \geq 1$	204.2838	95.75366	0.0000	82.79648	40.07757	0.0000
$r \leq 1^*$	$r \geq 2$	121.4873	69.81889	0.0000	52.95010	33.87687	0.0001
$r \leq 2^*$	$r \geq 3$	68.53723	47.85613	0.0002	30.14595	27.58434	0.0229
$r \leq 3^*$	$r \geq 4$	38.39129	29.79707	0.0040	21.74025	21.13162	0.0410
$r \leq 4^*$	$r \geq 5$	16.65104	15.49471	0.0334	14.43240	14.26460	0.0470
$r \leq 5$	$r \geq 6$	2.218640	3.841466	0.1364	2.218640	3.841466	0.1364

\*denotes rejection of the hypothesis at the 0.05 level. <sup>a</sup> p-values.

A close observance of the results reported in Table-3 reveals that there are five co integrating vectors in Trace as well as in Max-Eigen statistics. It means that the long run relationship between regional integration and infrastructure development has been confirmed. The coefficients for the long run relationship have been reported in Table-4.

**Table-4.Long-run Relationship**

Variables	Coefficients	t-statistics
<b>Dependent Variable: TO</b>		
POLITYII <sub>t</sub>	0.305335	4.350921
INF <sub>t</sub>	-0.386400	-3.809480
FDI <sub>t</sub>	1.13E-09	2.512139
EXR <sub>t</sub>	-0.146374	-4.017614
Z <sub>t</sub>	4.623609	3.120619
R-squared	0.558194	
F-statistic	9.096743	
Prob(F-statistic)	0.000012	
Durbin-Watson stat	1.547361	

The results reported in Table-4 shows that all variables are statistically significant. Democracy, foreign assistance and availability of physical infrastructure are significantly and positively affecting REI. Besides, one unit increase in physical infrastructure would increase the REI by 4.62 units. On the other hand, inflation and exchange rate are negatively related to REI.

Since the existence of long run relationship has been confirmed, this study has employed VECM for short run analysis. A negative and significant  $ECT_{t-1}$  term confirms the existence of long run relationship. The short run results are reported in Table-5.

**Table-5.Short-run Relationships**

<b>Variable</b>	<b>Coefficient</b>	<b>t-statistic</b>
<b>Constant</b>	<b>0.215714</b>	<b>0.216916</b>
<b><math>\Delta TO_{t-1}</math></b>	<b>-0.189730</b>	<b>-1.087279</b>
<b><math>\Delta TO_{t-2}</math></b>	<b>-0.041380</b>	<b>-0.269777</b>
<b><math>\Delta POLITY2_{t-1}</math></b>	<b>0.149471</b>	<b>1.416093</b>
<b><math>\Delta POLITY2_{t-2}</math></b>	<b>0.206647</b>	<b>2.074679</b>
<b><math>\Delta INF_{t-1}</math></b>	<b>0.064954</b>	<b>0.507209</b>
<b><math>\Delta INF_{t-2}</math></b>	<b>0.035353</b>	<b>0.345172</b>
<b><math>\Delta FDI_{t-1}</math></b>	<b>-5.97E-10</b>	<b>0.821399</b>
<b><math>\Delta FDI_{t-2}</math></b>	<b>1.08E-09</b>	<b>-1.729034</b>
<b><math>\Delta EXR_{t-1}</math></b>	<b>-0.506695</b>	<b>-2.264472</b>
<b><math>\Delta EXR_{t-2}</math></b>	<b>-0.274451</b>	<b>-1.083645</b>
<b><math>\Delta ZT_{t-1}</math></b>	<b>12.05771</b>	<b>1.236419</b>
<b><math>\Delta ZT_{t-2}</math></b>	<b>7.732299</b>	<b>0.713194</b>
<b><math>ECT_{t-1}</math></b>	<b>-0.247413</b>	<b>-2.158002</b>
<b><math>R^2</math></b>	<b>0.493580</b>	
<b>Adjusted R-squared</b>	<b>0.240371</b>	
<b>Durbin-Watson</b>	<b>2.233912</b>	

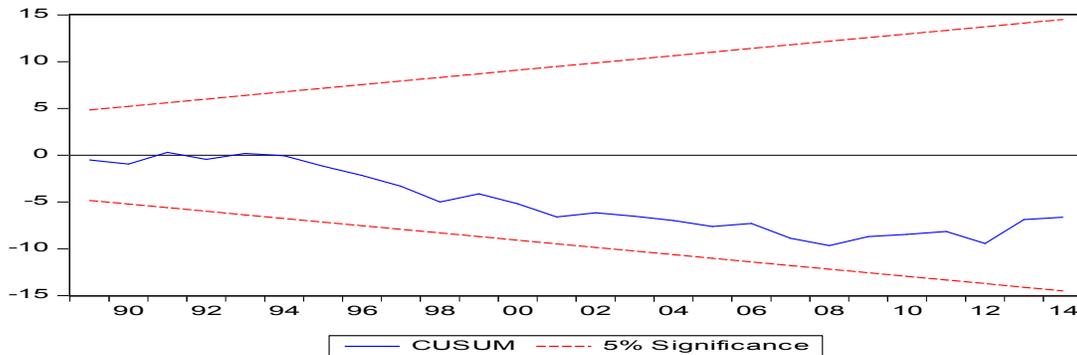
According to results reported in Table-5, a negative as well as significant  $ECT_{t-1}$  term has confirmed the existence of long run relationship where most of the variables are statistically insignificant in short-run. The coefficient of  $ECT_{t-1}$  shows the speed of convergence toward equilibrium in the long run which is considerably high. Some important diagnostic tests have been applied on our model. Their results are reported in Table-6. The results show that there is no problem of serial correlation. Also, the test statistics of ARCH test and Breusch-Pagan-Godfrey test show the non-existence of heteroskedasticity.

**Table-6.Diagnostic Tests (Short-Run Model)**

<b>Diagnostic Tests</b>	<b>F-statistics</b>	<b>Probability</b>
<b>Serial Correlation (Breush-Godfrey LM Test)</b>	<b>1.402965</b>	<b>0.2653</b>
<b>ARCH Test (Autoregressive Heteroskedasticity Test)</b>	<b>0.619273</b>	<b>0.4363</b>
<b>Breusch-Pagan-Godfrey (Heteroskedasticity Test)</b>	<b>0.698279</b>	<b>0.698279</b>

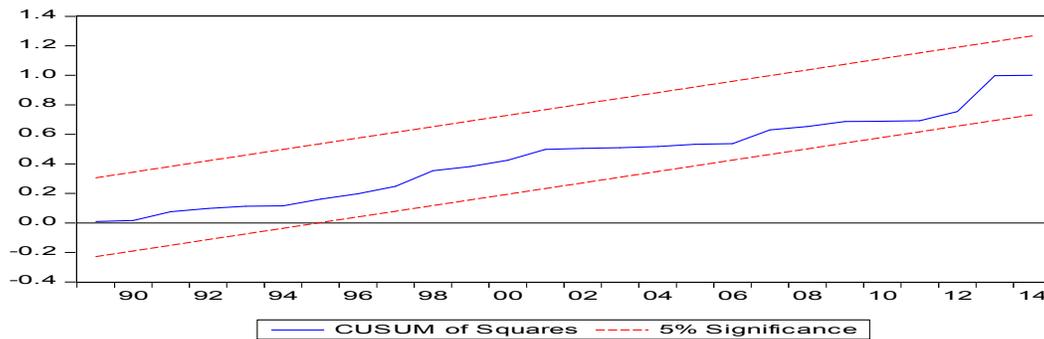
CUSUM and CUSUMsq are applied to check the stability of the coefficients. The results are reported in Fig-1 and Fig-2 respectively.

**Fig-1.Plot of Cumulative Sum of Recursive Residuals (CUSUM)**



The straight lines represent critical bounds at 5 percent significance level

**Fig-2. Plot of Cumulative Sum of Squares of Recursive Residuals (CUSUMsq)**



The straight lines represent critical bounds at 5 percent significance level

The plots of CUSUM and CUSUMsq allow us not to reject the null hypothesis of correctly specified regression equation. It is because both the plots of statistics are within the critical boundaries at 5% level of significance. This confirms that our model is correctly specified.

## 5. Conclusion and Recommendations

The empirical results of this study suggest that REI and physical infrastructure are highly correlated. Increased level of physical infrastructure would significantly increase REI in Pakistan. Differing from other studies (for instance, using a single indicator for infrastructure services), the present study has constructed an index of infrastructure by using multiple indicators (transportation, telecommunication and energy) combined through PCM. REI is measured by the proxy of trade liberalization. As all series are first difference stationary, we have incorporated Johansen co-integration and VECM for long run and short run dynamics respectively. The existence of long run relationship has been confirmed through co-integration as well as through negative and significant ECM term. The convergence towards equilibrium in the long run is also there.

The availability of physical infrastructure in Pakistan is low since 1947. According to Andrés et al. (2013), there is undersupply of public infrastructure services in Pakistan. Besides, level of private investment is also not satisfactory. In order to meet the requirements, Pakistan

need to spend 5.5 percent of GDP on electricity generation, 0.71 percent of GDP on telecommunication and 1.23 percent of GDP on transportation every year till 2020. The absence of necessary infrastructure is affecting country's export performance as well as growth. From the critical analysis of existing studies, it has been clear that cross border physical infrastructure positively and significantly contribute towards regional integration. The results of our study also confirm that developed infrastructure have positive effects on REI. In the light of these outcomes, we can say that CPEC is a game changer project for Pakistan's economy. This project has many benefits as well as challenges for Pakistan. In order to reap the fruits of CPEC fully, Pakistan must efficiently deal with the challenges.

Above all, political stability is the core for the successful implementation and functioning of CPEC. History of Pakistan's economy is full of political turmoil and inconsistent development policies. If this practice goes on, the completion and the desired outcomes from CPEC would be a dream. Political stability and political harmony in the long run would ensure the positive outcomes from CPEC. In addition, the reservation of Chinese authorities related to tax and tariff must also be resolved. Pakistan is facing war against terror on many fronts. Also the state and intensity of terror is not same across the country. In such situation, the multibillion dollar project of CPEC can detain. The poor law and order, security threats and violence in the region against the project and personals can delay the implementation of the economic corridor. Besides, India and US are also opposing CPEC. Situation can also be improved by maintaining national harmony and peace with the all provinces. Serious measures must be taken to ensure the security and protection of the officials and projects related personals.

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