

**Impact of CPEC on Social Welfare in Pakistan: A District Level Analysis**

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**32<sup>nd</sup> Annual General Meeting and Conference  
2016**

# Impact of CPEC on Social Welfare in Pakistan: A District Level Analysis

## *Abstracts*

*The main objective of this study is to forecast the short run net impact of CPEC projects on social welfare for all provinces and districts of Pakistan related to its three dimensions of welfare; education, health and housing. The development vitality of this mega project indicates that there will be 5.21 percent growth in social welfare in Pakistan, up till 2020. At provincial level highest growth in social welfare impact can be ranked as; in Balochistan (6.4 percent), Sindh (6.31 percent), KP (5.19 percent), and Punjab (3.5 percent), respectively. The net impact can also be depicted by its three dimensions of social welfare; education 3.85 percent, health 4.74 percent and housing 8.6 percent, also indicating high growth in terms of living standards. Districts which have high level of poverty and unemployment will significantly improve quality of life relative to other districts. Furthermore, districts which are located on its three routes also depict substantial growth in its welfare dimensions. Finally, the realization of CPEC is a manifestation of the shared dream of unprecedented prosperity for the region.*

*Keywords: CPEC, Social welfare, Education, Health, Living standards*

## **I. Introduction**

The effect of recent economic and financial crises provides a number of reasons to develop national and regional infrastructure in Asia as it enhances competitiveness and productivity. Regional infrastructure also help to increase the standard of living and reduce poverty by connecting isolated places and people with major economic centers and markets, narrowing the development gap among a region (Bhattacharyay, 2012). In this scenario China Pakistan Economic Corridor (CPEC) is critically important for both countries. Pakistan needs it to overcome its economic development, social and energy problems while China needs it to expand its periphery of influence, consolidate its global presence and securing future supply routes of energy and trade (Small,2015).

Pakistan enjoys a unique geographical landscape situated at the cross-roads in south Asia but it is considered as one of the least integrated region of the world. The CPEC projects with

investment of \$46 billion, is being developed as part of strategic partnership between the two countries Pakistan and China in 2013 which is a long term plan having a time frame of 2014 – 2030, with its two necessary conditions of the Corridor – development of the port at Gwadar and creating surface transport connectivity between the city of Gwadar in southwestern Pakistan to China's northwestern autonomous region of Xinjiang. The short-term programs will be completed by 2020 including the early harvest projects till 2017. The medium-term programs to be completed by 2025 while the long-term projects will be completed by 2030. Pakistan signs 43-years lease for Gwadar port with China and rented 2,300 acres of land to China for developing the first Special Economic Zone (SEZ) in the deep sea port of Gwadar. It was estimated that shipping cost will drop drastically if proposed route of CPEC is used by China and transit time will decrease more than ten days for its trade (Aqeel, 2016).

In developing countries like Pakistan, the phenomena of unemployment and disguised unemployment occur simultaneously as the population of poor stratum continues to rise. To promote inclusive and sustainable economic growth, employment and decent work for all is considered to be the key to eradicate extreme poverty and hunger, which is recognized as one of the ‘Sustainable Development Goals’. Employment and decent work can enhance social welfare when policies are taken to expand productive, remunerative and satisfying work opportunities; enhance workers’ skills and potentials. According UNDP (2015) Pakistan ranked at 147 out of 188 countries in term of Human Development Index and placed in low human development country. Given the present scenario, the CPEC project related investment in Pakistan for development of various sectors mainly; energy and infrastructure would predict in the creation of 700,000 direct jobs between 2015 to 2030 and add 2 to 2.5 percentage points to the country's annual economic growth. Furthermore, transport and infrastructure projects would allow easier

and low cost access to domestic and overseas markets, promoting inter-regional and international merchandise trade that would further surge private business investment and enhance productivity. This investment would also influence the stock market. The revenue and share prices will increase for the cement and steel sectors due to heavy construction. Productivity of manufacturers can also increase due to high demand and availability of energy. Consumer stock will also get benefits from the higher level of demand and income levels (Aqeel, 2016).

The main objective of this paper is to forecast the net impact of CPEC; early harvest projects and medium term projects in the short run on social welfare for all provinces and districts of Pakistan, specifically in three dimensions of welfare education, health and housing. The study is more focused on districts which are under the zone of influence of its three routes<sup>1</sup>; the western, central and eastern (Bengali, 2015). It is expected that this pioneer work will have an important contribution for public policy makers for designing appropriate policies, by keeping in mind the public welfare, especially for the vulnerable districts of Pakistan.

Limitation of the study; CPEC project is under construction so it is difficult to collect the exact data for enrollment rates, access to health care utilization and housing conditions, so the predicted outcomes are all based on the forecast and projections through the help of different tools and parameters.

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<sup>1</sup> There are three routes of the CPEC.

1. The Eastern route is stipulated to pass through Gwadar-Turbat-Panjgur-Khuzdar-Ratodero-Kashmore-Rajanpur-Dera Ghazi Khan-Multan-Faisalabad-PindiBhatian-Rawalpindi-Hasanabdal- and onwards.

2. The Central Route is stipulated to pass through: Gwadar-Turbat-Panjgur-Khuzdar-Ratodero-Kashmore-Rajanpur-Dera Ghazi Khan-Dera Ismail Khan-Bannu-Kohat-Peshawar-Hasanabdal-and onwards.

3. The Western route is proposed to pass through: Gwadar-Turbat-Panjgur-Khuzdar-Kalat-Quetta-Zhob-Dera Ismail KhanBannu-Kohat-Peshawar-Hasanabdal-and onwards.

## **II. Review of Literature**

In this section some literature related to CPEC projects and its socio-economic impact for Pakistan is discussed.

Education and health are closely related to travel time and mobility. Howard and Masset (2004) argue that reduced time and convenient mobility improved enrolment rates in developing countries. Mattson (2011) investigated that reduced time and convenient mobility increases access to the community for utilization of health care and education facilities. Keeping in mind the CPEC scenario, Habib, et al (2016) explored the impact of reduced travel time after the development of CPEC on school enrollment and maternal health care utilization for eleven districts that are situated within western route. He found a significance increase in school enrollment and attendance due to reduce travel time while a significant increase in utilization of lady health workers is also observed.

Hussain and Ali (2015) argued that CPEC will increase social connectivity among people. It is significant for Pakistan as well as China as it will increase economic activity in Pakistan. In this regard it was decided to prepare a Master Plan of CPEC by 2015 in four main areas of cooperation, i.e., transport, infrastructure, energy and industrial cooperation. In addition to it, China's strategic initiatives to build the Silk Road Economic Belt and the 21st-Century Maritime Silk Road will accelerate prospective regional as well as global development (Xudong, 2015).

Haris (2015) contended that industrialization in 'Special Economic Zone' along the CPEC will help in rehabilitation of Pakistan's deteriorated industrial units while, Tong (2015) expected that employment generation will take place mostly from the local community rather from China or

from any specific province of the country. It is also analyzed that because of so many projects via CPEC, the employment generation will also take place in a massive amount. Since Pakistan is a small economy compared to China, it will have to seek special protections for its local industries, (Hamid and Sarah, 2012).

While discussing three routes controversy of CPEC projects, Bengali (2015) investigated that lack of access to markets and to employment, educational, health and socialization opportunities in some areas defined as regional inequality, constitutes the basis of disaffection and insurgency; creating conditions for higher security costs. He computed a comparative opportunity cost of the three routes, in terms of three variables: population density, total area under cultivation, and total production of four major crops and concluded that the western route is likely to be the shortest and least cost bearing in terms of opportunity cost and dislocation compensation cost.

Using a newly updated measure of economic complexity to forecast annual growth rates over the next decade, it was believed that the higher growth rates will come because of gains in productive capabilities. Pakistan's predicted annual growth rate for the next 10 years is 5.07 percent, set to grow by 4.28 percent. It was also believed that the countries with the greatest potential for growth are located mainly in South Asia and East Africa. (CID, 2016).

Gilbert and Nilanjan (2012) analyze that for all south Asian economies, the efficient transport infrastructure would boost GDP. The highest rate of increase would be 14.8 percent as a percentage of current GDP in Nepal, followed by 4.10 percent in Bangladesh and 4.6 percent in Sri Lanka. In absolute terms, India would gain the most, by over \$ 4.3 billion, followed by Pakistan at \$ 2.6 billion. It would have an impact on household welfare through a reduction in regional transportation cost, with clear pro-poor outcomes in the region. The

household impacts were found to be positive for Pakistan including the south Asian countries, suggesting an expected drop in the absolute poverty level.

Hussain and Ali (2015) observed that CPEC is not only a road rather it will bring vast level of connectivity through road, railway, pipelines, fiber optics special economic zones etc. It was also elaborated that South Asian region is considered as one of the least integrated region of the world. So, this project is a big hope for Pakistan to connect with the region as well as, good for China to integrate its Western part with Pakistan and its nearby routes through oil imports (Xie et al, 2015).

CPEC is a game changer project which will lift millions of Pakistanis out of poverty trap and misery. The project embraces the construction of textile and apparel industry, industrial park projects, construction of dams, the installation of nuclear reactors and creating networks of road, railway line which will generate employment and people will also take ownership of these projects. Fully equipped hospitals, technical and vocational training institutes, water supply and distribution in undeveloped areas will also improve the quality of life of the masses (Abid and Ashfaq, 2015).

From the above discussion, it can be concluded that CPEC projects would have substantial impact on social welfare of Pakistan, through employment generation, gains in productive capabilities, reduced travel time and convenient mobility, etc.

### **III. Data and Methodology**

To examine the socio-economic welfare impact of CPEC projects in different regions of Pakistan, a district level analysis is conducted by employing data from the tenth round of the Pakistan Social and Living Standards Measurement (PSLM) Survey 2014-15 (Pakistan, 2015). The survey consists of 5428 sample blocks (Primary Sampling Units) and 81992 households (Secondary Sampling Units), which is expected to produce reliable results at the district level. In this survey, 78,635 households were covered in the entire country and information was collected from households on a range of social sector issues. The survey primarily focused on the main sectors i.e. education, health, including child and maternal health and housing conditions in the overall context of Sustainable Development Goals (SDGs). The study covered 115 districts of Pakistan, 36 districts from Punjab, 24 districts from Sindh, 25 districts from KP and 30 districts from Baluchistan. Two districts of Balochistan, namely Panjgur and Khuzdar were not covered in PSLM, 2014-15 due to security reasons so the values were imputed by using growth rates of previous years. The study consists of objective indicators of social welfare with its three dimensions namely, access to education, access to child and maternal health and living standard measured as housing conditions.

#### **Indicators Used for Composite Social Welfare Index for Pakistan**

Indicators are the backbone of measurement and their quality, accuracy, and reach determine the informational content of welfare measures. The selection of indicators should be transparently justified, interpretable and reflect the direction of change (Midgley,2013). In this regard following are the indicators to measure social welfare across districts of Pakistan.

A) Education indicators by districts;

- i) Primary net enrolment ratio:- Number of children attending primary level (classes 1-5) aged 6-10 years divided by children aged 6-10 years multiplied by 100. Enrolment in *Katchi* is excluded.
- ii) Middle net enrolment ratio:- Number of children attending middle level (classes 6-8) aged 11-13 years divided by number of children aged 11-13 years multiplied by 100.
- iii) Matric/Secondary net enrolment ratio:- Number of children aged 14-15 years attending matric level (classes 9-10) divided by number of children aged 14-15 years multiplied by 100.

B) Child and Maternal Health indicators by districts;

- i) Children aged 12-23 months who had reported to receive full immunization based on record, expressed as a percentage of all children aged 12-23 months. To be classified as fully immunized; a child must have received: 'BCG', DPT1, DPT2, DPT3, Polio1, Polio2, Polio3 and Measles.
- ii) Pre-natal:- Ever married women aged 15 – 49 years who had given birth in the last three years and who had attended at least one pre-natal consultation during the last pregnancy, expressed as a percentage of all ever married women aged 15 – 49 years who had given birth in the last three years.
- iii) Safe childbirth at facility
- iv) Post-natal:- Post-natal is the period beginning immediately after childbirth and extending for about six weeks. Ever married women aged 15-49 years who had received post-natal check-up expressed as a percentage of all ever married women aged 15-49 years who had a birth in the last three years.

C) Housing indicators by districts taken as living standard;

- i) Percentage distribution of households by material used for roof (RBC/RCC).
- ii) Main source of safe drinking water (tap water or motor pump).
- iii) Percentage distribution of households by gas as fuel used for cooking.

In Table 1 some mean values related to social welfare indicators at provincial levels are presented to evaluate disparity in quality of life in Pakistan.

**Table. 1 Statistics of Social Welfare Indictors in Provinces of Pakistan (%)**

<b>Indicators</b>	<b>Punjab</b>	<b>Sindh</b>	<b>KPK</b>	<b>Balochistan</b>	<b>Pakistan</b>
Net enrolment rate at the primary level	70	61	71	56	67
Net enrolment rate at the middle level	38	31	41	26	37
Net enrolment rate at the matric level	29	25	27	15	27
Children fully immunized- Based on record	70	45	58	27	60
Pre – natal consultations	78	72	64	47	73
Safe childbirth at facility	57	57	54	36	55
Post- natal consultations	29	33	25	21	29
Material used for roof (RBC/RCC)	24.5	34.5	35	7	30
Main source of safe drinking water	63	52	61	51	60
Gas as fuel used for cooking	39	56	26	25	41

Source: Based on ‘The Pakistan Social and Living Standards Measurement Survey 2014-15’

## **Methodology**

Statistical techniques are widely used in the design of poverty measures as well as in measures of well-being (Maggino and Zumbo 2012). Key techniques include principle component analysis, multiple correspondence analysis, cluster analysis, latent class analysis, and factor analysis. In this study two indices are constructed. Firstly, principle component analysis (Murtagh and Heck, 1987) is used for ranking districts of Pakistan in terms of social welfare. Principal Components Analysis (PCA) generates components in descending order of importance, that is, the first component explains the maximum amount of variation in the data, and the last component the minimum (Haq and Zia, 2013) . On the bases of these factors an index of weighted factor score is constructed for ranking social welfare across districts of Pakistan. Secondly,

nested weighted social welfare indices similar to Human Development Index UNDP (2014) and Alkire, *et al* (2015) are constructed to measure the impact of CPEC projects in growth of quality of life, across districts of Pakistan. Like Human Development Index, these indices also measure average achievement in three basic dimensions of human development— education, health, and a decent standard of living. The importance of social welfare index can be declared by first Human Development Report (UNDP, 1990) that the means of development have obscured its ends because of two primary factors:

*“First, national income figures, useful though they are for many purposes, do not reveal the composition of income or the real beneficiaries. Second, people often value achievements that do not show up at all, or not immediately, in higher measured income or growth figures: better nutrition and health services, greater access to knowledge, more secure livelihoods, better working conditions, security against crime and physical violence, satisfying leisure hours, and a sense of participating in the economic, cultural and political activities of their communities. Of course, people also want higher incomes as one of their options. But income is not the sum total of human life”.*

To represent a new global development compact, the 2030 Agenda for Sustainable Development comprising the 17 Sustainable Development Goals (SDGs) and 169 targets encompassing three core dimensions of economic, social and environmental development was adopted at the United Nations by the 193 Member States in 2015. Although a number of Millennium Development Goals (MDGs) have been achieved including the poverty reduction goal but the progress has been uneven across goals, and across and within countries, especially in south Asia which represents the largest concentration of poverty and hunger in the world. Hence, the SDGs provide to the region a transformative opportunity for a life of dignity and sustainable prosperity to all, (ESCAP,2016).

Keeping in mind the importance of Sustainable Development Goals and Human Development Index, this study had constructed two welfare indices (UNDP, 2014) for districts of

Pakistan; one for present scenario of social welfare and second one to depict the impact of CEPC projects on wellbeing by using the standard deviation method which is based on the concept of simplest forecasting model (Nau, 2014). Using the two series, an index of growth rates are computed for social welfare using its three dimensions; education, health and housing for  $i^{th}$  district in  $j^{th}$  province.

### 1. Methodology for Present Scenario of Composite Social Welfare Index

In this analysis the Composite Social Welfare Index (CSWI) has taken ten indicators: three each for education and living standard, and four for health. These indicators are included in Sustainable Development Goals: Goal<sub>3</sub> for health, Goal<sub>4</sub> for education and Goal<sub>6,7,11</sub> for living standards (ESCAP,2016). The Composite Social Welfare Index ( CSWI) is the geometric mean of the three dimensional indices. The weights used in this analysis assign 1/3 of the CSWI's total weight to each of the three core dimensions: education, health and living standards (UNDP, 2014). The nested weights (Pakistan, 2014) assigned to each indicator are corresponding to the share in respective dimension. The data for welfare indicators are the mean value of each indicator across districts:  $X_{ij}$  = Three welfare dimensions in  $i^{th}$  district in  $j^{th}$  province.

$$CSWI_{ij} = (X_{ij,Education} * X_{ij,Health} * X_{ij,Housing} )^{1/3} \quad (1)$$

#### 1. Education dimension, $X_{ij,Education}$

$$X_{ij,Education} = NEP_{ij} + NEM_{ij} + NES_{ij}$$

$NEP_{ij}$ = Net enrolment ratio at the primary level

$NEM_{ij}$  = Net enrolment ratio at the middle level and

$NES_{ij}$  = Net enrolment ratio at the matric/secondary level

The nested weight structure (Alkire, et al, 2015) are assigned to each indicator correspond to the share in education dimension.

## 2. Health dimension, $X_{ij,Health}$

$$X_{ij,Health} = 0.5 CH_{ij} + 0.5MH_{ij} \text{ or } X_{ij,Health} = 0.5 CH_{ij} + 0.5(PrNC_{ij} + SCF_{ij} + PNC_{ij})$$

$0.5 CH_{ij}$  = Children fully immunized- Based on record

$0.5 MH_{ij}$  = Maternal health care utilization

$$0.5 MH_{ij} = PrNC_{ij} + SCF_{ij} + PNC_{ij}$$

$PrNC_{ij}$  = Pre – natal consultations,  $SCF_{ij}$  = Safe childbirth at facility

$PNC_{ij}$  = Post- natal consultations

The weights assigned to each index of child and maternal health is 50 percent while weights assigned to each indicator of maternal health care utilization correspond to the share in overall maternal health care utilization for its respective indicators.

## 3. Housing dimension, $X_{ij,Housing}$

$$X_{ij,Housing} = QR_{ij} + SDW_{ij} + QF_{ij}$$

$QR_{ij}$  = Quality of household by material used for roof (RBC/RCC)

$SDW_{ij}$  = Safe drinking water (tap water or motor pump)

$QF_{ij}$  = Quality of fuel (gas) used for cooking

The nested weights assigned to each indicator are corresponding to the share in respective dimension.

## 2. Methodology of CPEC Scenario for Composite Social Welfare Index: The Simplest Forecasting Model

Forecasting is an important aid in effective and efficient planning for the given circumstances or for any time horizon involved. Some of general principles for forecasting are to use methods that are structured, quantitative, causal, and simple. One of the most enduring and useful

conclusions from research on forecasting is that simple methods are generally as accurate as complex methods (Armstrong, 1985). In this regard, to forecast the net impact of CPEC projects on social welfare, a methodology is employed, based on the concept of simplest forecasting model, the mean model (Nau, 2014). This simplest forecasting model assumes that the data consists of independently and identically distributed values, as if each observation is randomly drawn from the same population. So the most natural forecast to use is the sample mean of the historical data because by definition it is an unbiased predictor and also it minimizes the mean squared forecasting error regardless of the shape of the probability distribution. The sample mean has the property that it is the value around which the sum of squared deviations of the sample data is minimized.

To forecast the net impact of CPEC projects on social welfare, mean and standard deviation are computed for each welfare indicator across districts. It is expected that there will be improved geographic connectivity, employment generation due to increase in business activities and improvement in households income which will improve the social welfare indicators, especially in those districts which are located in three zones of influence / route of CPEC.

Now for forecasting with the mean model:

Let  $X_{ij,forecast}$  denote a forecast of  $X_{ij}$  based on observed data. In the special case of the mean model, the sample standard deviation (s) is what is called the standard error of the model, i.e., the estimated standard deviation of the intrinsic risk. Now, the standard deviation of the error term is used as to forecast for  $X_{ij}$ . This is called the standard error of the forecast  $SE_{forecast}$ , and it depends on both the standard error of the model and the standard error of the mean. Specifically, it is the square root of the sum of the squares of those two numbers calculated for  $i^{th}$  indicator in  $j^{th}$  province:

$$SE_{ij,forecast} = \sqrt{S^2 + ES_{mean}^2} = \sqrt{1 + 1/n}$$

$SE_{ij,forecast}$ , the standard error, measures the forecasting, assuming the model is correct.

$S^2$ , the standard error (for  $i^{th}$  indicator in  $j^{th}$  province) of the model measures the intrinsic risk (estimated ‘noise’ in the data); for the mean model, the standard error of the model is just the sample standard deviation.

$ES_{mean}^2$ , the standard error of the mean for  $i^{th}$  indicator in  $j^{th}$  province in the model measures the parameter risk (error in estimating the ‘signal’ in the data)

For the mean model (Nau, 2014), the result is that the forecast standard error is slightly larger than the sample standard deviation. As the study is based on cross section data for different indicators at one point in time, so naive forecasting technique is also incorporated in which last period actuals are used as the this period forecast (Armstrong, 2001). So in this analysis mean value of all welfare indicators,  $X_{ij}$  are used as the base period for forecasting instead of taking the sample mean.

A point forecast should always be accompanied by a confidence interval to indicate the accuracy range of the forecast values (Hyndman, 2014). In this analysis appropriate confidence interval with critical t-values had been adopted to give a forecast time horizon.

Confidence interval for  $X_{ij,forecast} = X_{ij} \pm (\text{critical t-value}) \times (SE_{ij,forecast}, \text{standard error of forecast})$

Here, ‘confidence’ means a sort of like ‘probability’ but not exactly. Rather, there is a probability that the future data will fall in the calculated confidence interval for the forecast. A ‘t-table’ showing the critical values of the t distribution for some representative values of the confidence level ( one-sided, for an upper bound) and the number of degrees of freedom are used with a forecast horizon ranging from one to fifteen years that is 2016-2030. Here the weight for

forecast time horizon is  $\alpha$  with value  $0 \leq \alpha \leq 1$ . To measure the short run impact of the project, the value for  $\alpha$  is taken as 0.2 while for rest of the period it is  $(1 - \alpha)$ . A smaller weight is given to recent period to measure the short run impact of the project because the flow of investment has not taken its full momentum. Finally, two measures of confidence intervals are taken to forecast the net impact of social welfare for the short run of the projects with  $\alpha=0.2$ . For district located on CPEC rout / zone of influence regions, a 68% confidence interval is taken because these regions will get the direct benefit of this mega project.

$$X_{ij,forecast} (68\% \text{ confidence interval}) = X_{ij} + \alpha * [(\text{critical t-value}) \times (SE_{forecast})]$$

$$X_{ij,forecast} (50\% \text{ confidence interval}) = X_{ij} + \alpha * [(\text{critical t-value}) \times (SE_{forecast})]$$

For all other districts of Pakistan, 50% confidence interval is used as these regions will have indirect or multiplier impact of huge employment generation, growth in income and geographic connectivity. The nice thing about a 50% confidence interval is that it is a ‘coin flip’ as to whether the true value will fall inside or outside of it, which is extremely easy to think about. Also, confidence intervals for forecasts at high levels of confidence tend to be so wide as to not be very informative while the 50% intervals are often more helpful as visual reference points, particularly when comparing the degree of overlap between forecasts produced by different models. In general, the consequences of error in the decision problem at hand, as well as the expectations of the audience, should be taken into account when choosing a confidence level to emphasize (Nau, 2014).

$$CSWI_{ij,forecast} = (CX_{ij,forecast,Education} * CX_{ij,forecast,Health} * CX_{ij,forecast,Housing})^{\frac{1}{3}} \quad (2)$$

$$CX_{ij,forecast,Education} = NEP_{ij,forecast} + NEM_{ij,forecast} + NES_{ij,forecast}$$

$$CX_{ij,forecast,Health} = 0.5 CH_{ij,forecast} + 0.5MH_{ij,forecast}$$

$$CX_{ij,forecast,Housing} = QR_{ij,forecast} + SDW_{ij,forecast} + QF_{ij,forecast}$$

The descriptions of predicted welfare indicators  $CX_{ij,forecast}$  are same as given for present scenario of social welfare indicators in the first model.

By employing the two indices, present scenario and CPEC scenario, the growth rates are constructed for each indicator of education, health and housing to demonstrate the net impact on these three dimensions of social welfare. Finally, a composite social welfare index is constructed for each district to forecast the net impact of CPEC projects in the short-run for which more than half (\$28 billion) is allocated.

Following is the growth rates for the three dimensions which are incorporated to construct growth in social welfare as given in equation in 6.

$$Growth\ in\ Education\ Index(GX_{ij,Education}) = \frac{CX_{ij,forecast,Education} - X_{ij,Education}}{X_{ij,Education}} * 100 \quad (3)$$

$$Growth\ in\ Health\ Index(GX_{ij,Health}) = \frac{CX_{ij,forecast,Health} - X_{ij,Health}}{X_{ij,Health}} * 100 \quad (4)$$

$$Growth\ in\ Housing\ Index(GX_{ij,Housing}) = \frac{CX_{ij,forecast,Housing} - X_{ij,Housing}}{X_{ij,Housing}} * 100 \quad (5)$$

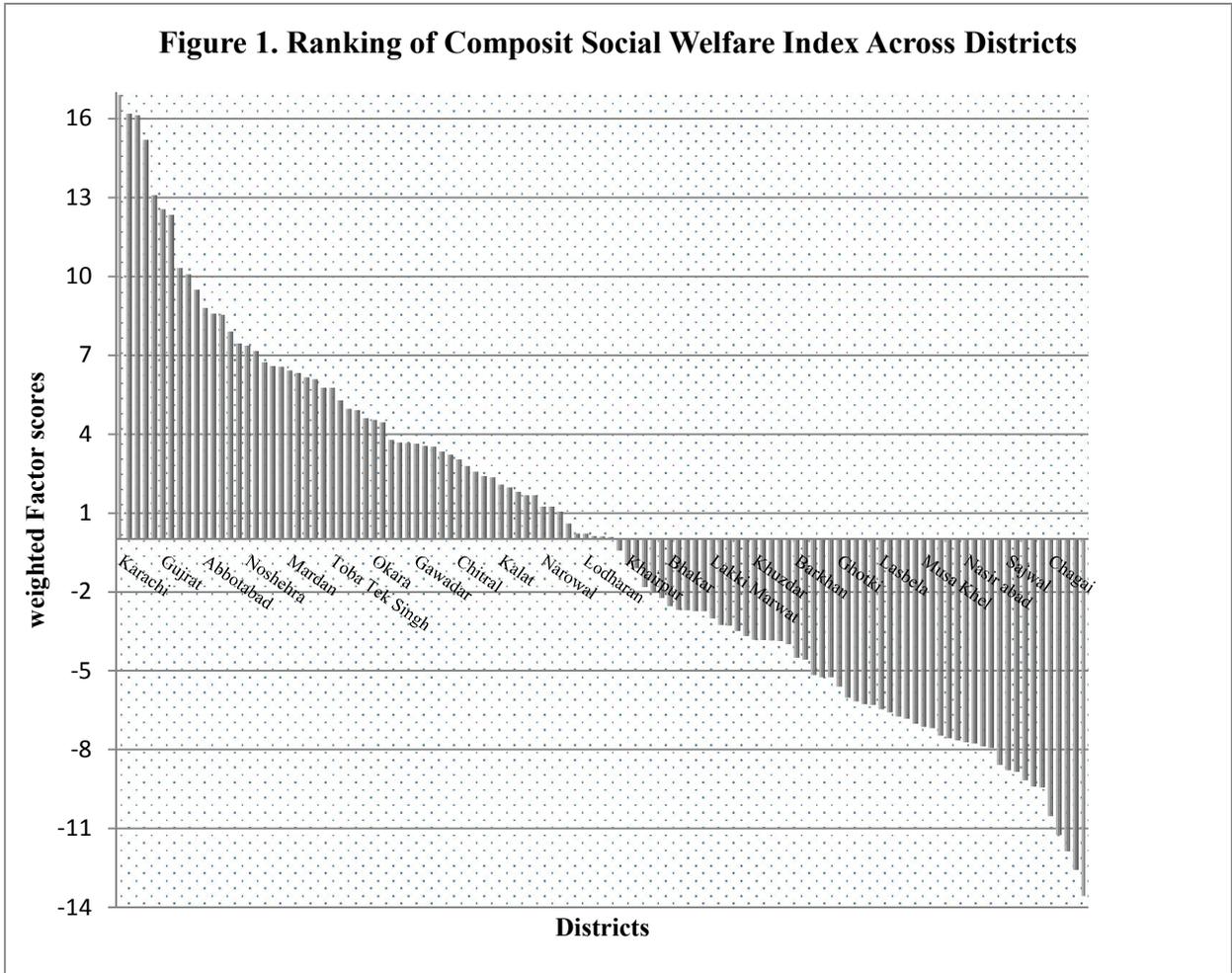
$$Growth\ in\ Social\ Welfare\ (CSWI_{ij}) = (GX_{ij,Education} * GX_{ij,Health} * GX_{ij,Housing})^{1/3} \quad (6)$$

## **IV. Analysis**

In Pakistan the capital and main cities are the largest agglomerations of economic activity and the main generator of regional flows. In this regard, the colossal projects of CPEC have a profound impact not only on economic growth but also on social welfare because its route touches the major cities of Pakistan. It has also a multiplier effect on remote regions in terms of employment and other social indicators which facilitates concise, comprehensive and balanced judgments about the condition of major aspects of society. These are in all cases a direct measure of welfare and if it changes in the 'right' direction, while other things remain equal, people are 'better off' as these indicators measure individual and household well-being. The social indicators have two main purposes to serve in development planning: first, they help to crystallize the goals of development planning in terms of targets; second, they help to measure the progress made towards the goals in relation to the targets set.

The CPEC scenario, is predicted to create more or less 700,000 direct jobs between 2015 and 2030, and is eventually going to add 2 to 2.5 percentage points to the country's annual economic growth. The aim of this analysis is to investigate the impact of social welfare in terms of education, health and housing across districts of its four provinces. In this regard to observe the social ranking of 115 districts of Pakistan, a weighted composite welfare index is constructed using the principal component analysis which also gives the implicit weights to its welfare indicators. A high value of this index gives high welfare ranking while a low value depicts deprivation in social welfare (Appendix. A). It is analyzed that there is huge disparity across the districts of Pakistan as seen in Figure 1. Most of the districts of Balochistan are placed in low ranking, i.e Chagai, Kila Abdullah, Dera Bugti and Kohistan. In terms of wellbeing Balochistan

ranked as the most deprived province where 62 percent population is placed in the category of bad quality of life (Haq and Zia, 2012). Some of the other districts of Pakistan are also vulnerable in terms of wellbeing, i.e, Ranjan pur, Thatta, D.G Khan and Umerkot, etc. It is predicted that the CPEC investment has a significant direct and indirect impact on the economy of Pakistan. Direct impact of investment can lift the GDP growth beyond 6 percent for the fiscal years 2016-18 while the indirect impact is long term impact for the economy of Pakistan and much higher than the direct impact due to the bulk of the investment in energy sector that has the potential to give a boost to current industry of Pakistan and attract the private investors. The World Bank and IMF have also linked their future growth rate with the success of CPEC projects, predicting that Pakistan needs seven percent plus growth rate to ensure real improvements in the economy.



**Table. 2 Net Impact of CPEC on Social Welfare Indices in Districts of Punjab up till 2020 (%).**

Districts	Education Index	Health Index	Housing Index	Composite Index of Social Welfare
Attock	2.28	1.86	3.35	2.42
Bahawalnagar	3.64	2.23	6.50	3.75
Bahawalpur	4.32	2.56	5.73	3.98
Bhakar	3.22	2.22	10.45	4.21
Chakwal	2.19	1.78	3.75	2.44
Chiniot	3.18	2.14	5.68	3.38
D.G.Khan*	5.01	4.23	11.31	6.20
Faisalabad*	3.52	3.46	6.61	4.31
Gujranwala	2.63	1.92	2.94	2.45
Gujrat	2.30	1.69	2.99	2.27
Hafizabad	2.90	2.20	4.71	3.11
Jhelum	2.32	1.65	3.28	2.32
Jhang	3.14	2.77	6.99	3.93
Kasur	3.00	1.94	6.98	3.43
Khanewal	3.10	2.37	4.55	3.22
Khushab	3.02	2.19	6.30	3.46
Lahore*	3.43	2.72	3.69	3.25
Layya	2.39	2.11	8.37	3.48
Lodharan	3.51	2.55	4.87	3.51
Mandi Bahauddin*	3.47	2.87	8.16	4.33
Mianwali	2.91	2.09	7.39	3.55
Multan*	4.53	3.28	5.56	4.35
MuzafarGarh	3.83	2.69	11.96	4.97
Nankana Sahib	2.68	1.71	5.18	2.87
Narowal	2.36	2.12	4.66	2.85
Okara	2.72	2.12	3.77	2.79
Pakpattan	3.09	2.24	4.17	3.07
Rahim Yar Khan	4.51	2.87	9.45	4.96
RajanPur*	5.39	3.30	15.28	6.30
Rawalpindi*	3.15	2.64	4.36	3.31
Sahiwaal	2.97	1.83	4.19	2.83
Sargodha	2.81	2.08	6.44	3.35
Sheikhupura	2.77	1.94	3.35	2.62
Sialkot	2.34	1.80	3.02	2.33
Toba Tek Singh	2.57	2.07	4.60	2.90
Vehari	3.14	2.11	4.43	3.08
<b>Average</b>	<b>3.18</b>	<b>2.34</b>	<b>5.90</b>	<b>3.50</b>

Source: Estimates are based on 'The Pakistan Social and Living Standards Measurement Survey 2014-15'

\* Districts located on three routes of CPEC.

To analyze the net social welfare impact of CPEC across four provinces and its respective districts, a social welfare index, similar to UNDP human development index (1990) is constructed with its three dimensions; education, health and housing. As it is earlier mentioned that this

project would have great significance in enhancing bilateral connectivity, improving people's livelihood and fostering pragmatic economic and trade cooperation. It works on the principle of "one corridor with multiple passages" aiming at directly benefitting the socio-economic development of Pakistan, especially the western and north-western regions and providing significant importance to Gwadar port. The break-up of CPEC projects are listed as; Punjab 12, Sindh 13, KPK 8 and Balochistan 16.

Punjab is the most populous of the four provinces of Pakistan with 55 percent of population share, 25.8 percent landmass and 21 percent poor population. BISP (2016) reported a high youth unemployment for male; Rahim Yar Khan 65, Jhang 55.7, Khanewal 58.6 and Nankana Sahib 53.5 percent, etc. Given the provincial profile, it is predicted that the present CPEC projects have considerable impact on quality of life at all level. Following are the 12 projects related to Punjab are: Optical Fiber Cable from Rawalpindi to Khunjrab, Haier & Ruba Economic Zone II, Karach-Lahore Motorway (Sukkur-Multan), Joint Feasibility Study for upgradation of ML1, Upgradation of ML-1, Sahiwal Coal Fired Power Plant, Rahimyar Khan Coal Power Plant, Karot Hydro-Power Plant, Lahore Orange Line Metro Train, Matiari-Lahore Transmission Line, Matiari-Faisalabad Transmission Line, Quaid-i-Azam Solar Park in Bahawalpur. These projects will create not only millions of employments opportunities but also enhance the living standard of local community.

Table 2, present the net impact of the short-term programs including 'early harvest' projects of CPEC on social welfare in districts of Punjab up till year 2020. It is observed that average impact of social welfare is 3.5 percent in Punjab while its three dimensions education, health and housing had 3.18 percent, 2.34 percent and 5.9 percent, respectively. Housing index which includes three indicators of wellbeing are quality of roof, access to safe water and gas as

cooking fuel are used as a proxy for household income. It had a high growth in quality of life as compare to other human capital indices, education and health. The districts located on zone of influence (districts located on routes) have relatively higher impact as compared to other districts. Some other districts which have high incidence of poverty such as Rahim Yar Khan 44 percent, Bahawalpur 29.5 percent and Kasur 30 percent also depict significant welfare impact of CPEC projects up till 2020.

**Table. 3 Net Impact of CPEC on Social Welfare in Districts of Sindh up till 2020 (%).**

Districts	Education Index	Health Index	Housing Index	Composite Index of Social Welfare
Badin	4.42	4.42	15.17	6.65
Dadu	2.27	3.35	6.33	3.63
Ghotki	3.61	9.24	12.24	7.41
Haiderabad	2.80	3.36	3.73	3.27
Jacobabad	3.77	8.64	20.75	8.75
Jamshoro	3.08	3.86	6.42	4.24
Karachi*	3.48	4.26	3.62	3.77
Kashmor*	6.56	13.38	23.75	12.74
Khairpur	2.74	6.37	13.78	6.21
Larkana*	4.15	6.08	9.33	6.16
Matiari	3.63	3.72	10.12	5.14
Mirpur Khaas	3.59	4.43	10.87	5.56
Naushehro Feroz	2.76	3.89	9.39	4.65
S. Benazirabad	4.66	4.79	23.97	8.10
Sajwal	2.70	4.50	5.27	4.00
Sakhur	3.67	5.60	11.34	6.14
Sanghar	3.45	4.92	15.09	6.34
Shahdatkot	2.97	5.36	10.47	5.50
Shikarpur	3.62	6.47	12.36	6.60
Tadu Alayaar	3.99	4.32	8.65	5.29
TandoM. Khan	5.77	4.87	17.03	7.81
Tharparkar	3.82	7.23	25.14	8.89
Thatta	6.10	5.07	12.74	7.32
Umerkot	3.77	4.24	24.62	7.32
<b>Average</b>	3.81	5.52	13.0	6.31

Source: Estimates are based on ‘The Pakistan Social and Living Standards Measurement Survey 2014-15’

\* Districts located on three routes of CPEC.

The province of Sindh is the second in terms of population with 24.3 percent share and 44.65 percent poverty rates. Sindh contains two commercial seaports - Port Bin Qasim and the Port of Karachi.

The 13 CPEC projects related to Sindh are: Matiari-Lahore Transmission Line, Matiari-Faisalabad Transmission Line, Port Qasim Power Plant, Engro Thar Power Plant & Surface Mine in Block II of Thar Coal Field , Dawood Wind Farm, Jhampir wind Farm, Sachal Wind Farm, China-Sunec Wind Farm, Upgradation of ML-1. Thar Coal Block I & Mine Mouth Power Plant, Gwadar-Nawabshah LNG Terminal & Pipeline, Karachi-Lahore Motorway (Sukkur- Multan) and Joint Feasibility Study for Upgradation of ML-1. The impact of these multimillion projects would have significant impact on quality of life in the respective districts of Sindh. The net impact of CPEC projects on social welfare and its dimensions can be depicted in Table 3. It is examined that a 6.31 percent of significant growth in social welfare index can be observed in Province of Sindh with its three components as education 3.81 percent, access to child and maternal health care services 5.52 percent and improved quality of housing 13.0 percent. The districts which are placed in lower ranking of social wellbeing as depicted in Appendix A, also exhibited substantial growth in social welfare.

For provincial disaggregation, at least eight projects under CPEC are related to KPK. These projects include: Joint Feasibility Study for Upgradation of ML-1, Establishment of Havelian Dry Port, KKH II (Havelian-Thakot), Upgradation of ML-1, KKH III (Raikot-Thakot), D.I Khan-Quetta highway (N-50), Suki Kinari Hydropower Project and Optical Fiber Cable from Rawalpindi to Khanjrab.

Khyber Pakhtunkhwa (KPK) is the smallest province by size, located in northwestern region of Pakistan with 11.9 percent share in total population. The province had 36.9 percent poor population and 23.8 percent unemployed youth, BISP (2016).

**Table.4 Net Impact of CPEC on Social Welfare in Districts of KPK up till 2020 (%)**

<b>Districts</b>	<b>Education Index</b>	<b>Health Index</b>	<b>Housing Index</b>	<b>Composite Index of Social Welfare</b>
Abbotabad	2.74	3.12	3.90	3.21
Bannu*	4.11	10.64	7.46	6.87
Batagram	4.23	5.67	5.56	5.10
Buner	3.03	4.13	5.53	4.10
Charsadda	3.00	3.68	5.01	3.80
Chitral	2.75	3.69	6.06	3.94
D.I Khan**	6.55	7.42	15.74	9.12
Haripur	2.57	3.30	4.02	3.24
Hungo	3.29	4.06	5.05	4.07
Karak	3.57	6.16	7.25	5.41
Kohat*	4.41	5.53	8.55	5.92
Kohistan	7.47	10.18	15.34	10.46
Lakki Marwat	3.15	8.66	7.19	5.80
Lower Dir	3.07	3.20	5.90	3.86
Malakand PA	2.59	3.75	5.20	3.69
Mansehra	2.96	4.09	5.93	4.15
Mardan	2.61	3.32	4.50	3.39
Noshehra	2.67	3.46	4.44	3.45
Peshawar*	4.32	4.79	5.59	4.87
Shangla	5.45	6.58	8.88	6.82
Swabi	2.64	3.90	4.38	3.55
Swat	2.98	3.56	4.88	3.72
Tank	4.58	5.61	6.76	5.57
Tor Ghar	5.65	13.15	6.23	7.60
Upper Dir	4.32	4.90	11.53	6.23
<b>Average</b>	3.79	5.94	7.03	5.19

Source: Estimates are based on 'The Pakistan Social and Living Standards Measurement Survey 2014-15'

\* Districts located on three routes of CPEC.

The profile of social welfare across districts of KPK is exhibited in Table 4. The composite index of social welfare revealed a 5.19 percent growth while its three dimension education, health and housing had growth of 3.79 percent, 5.94 percent and 7.03 percent,

respectively. The quality of life in terms of housing had highest impact of welfare, then comes health and education at all districts level. The districts located on CPEC routes such as Peshawar, Kohat, Bannu, and D.I.Khan had significant impact of social welfare.

**Table.5 Net Impact of CPEC on Social Welfare in Districts of Balochistan up till 2020 (%)**

Districts	Education Index (%)	Health Index (%)	Housing Index (%)	Composite Index of Social Welfare (%)
Awaran	3.89	4.05	9.71	5.34
Barkhan	4.00	3.86	14.65	6.08
Chagai	5.43	6.46	14.17	7.91
Dera Bugti	7.26	16.72	9.39	10.42
Gawadar**	4.05	5.72	7.82	5.65
Harnai	6.89	6.03	8.68	7.11
Jaffar Abad	4.50	6.59	10.34	6.73
Jhal Magssi	4.32	5.37	11.78	6.47
Kachi (Bolan)	4.92	5.05	8.93	6.04
Kalat**	5.18	6.24	6.64	5.98
Ketch*	4.58	7.82	10.40	7.18
Kharan	3.90	4.31	6.19	4.70
Khuzdar**	5.19	9.37	9.64	7.75
Kila Abdullah	6.24	8.45	9.58	7.95
Killa Saif Ullah	4.19	5.17	4.30	4.52
Kohlu	4.86	6.20	10.55	6.81
Lasbela	4.68	3.83	8.13	5.25
Loralai	3.28	7.73	9.14	6.13
Mastung	2.78	4.75	4.12	3.79
Musa Khel	4.13	6.28	11.23	6.61
Nasir abad	5.58	7.38	16.00	8.68
Noshki	3.78	5.69	4.13	4.45
Pishin	5.08	5.38	4.67	5.03
Punjgur*	4.92	7.52	12.88	7.79
Quetta**	4.54	4.92	5.84	5.06
Sheerani	5.19	5.13	10.59	6.54
Sibbi	4.47	3.73	5.44	4.48
Washuk	3.98	8.72	12.46	7.55
Zhob**	6.57	6.04	16.37	8.64
Ziarat	3.84	5.31	10.63	5.99
<b>Average</b>	<b>4.74</b>	<b>6.33</b>	<b>9.48</b>	<b>6.42</b>
<b>Pakistan</b>	<b>3.85</b>	<b>4.74</b>	<b>8.60</b>	<b>5.21</b>

Source: Estimates are based on 'The Pakistan Social and Living Standards Measurement Survey 2014-15'

\* Districts located on three routes of CPEC.

Giving the break-up of CPEC projects at provincial level, 16 are related to Balochistan. These mega-development initiatives consist of, Khunzdar-Basima Highway (N-30), D. I. Khan-Quetta Highway (N-50), Hubco Coal Power Plant, Gwadar Power Plant, Gwadar-Nawabshah LNG Terminal and Pipeline, Gwadar Eastbay Expressway, Gwadar New International Airport, Gwadar Smart Port City Master Plan, Expansion of multipurpose terminal including Breakwater & Dredging Wastewater, Treatment Plants for Gwadar city, Gwadar Primary School, Gwadar Hospital Upgradation, Gwadar Technical & Vocational College, Gwadar Eastbay Expressway II, Freshwater Supply and Gwadar Free Zone. These investment and construction of energy and infrastructure projects under CPEC have a significant long term impact both for Pakistan and China in social, economic, culture and natural resources.

Balochistan is the one of the fourth province of Pakistan located in the southwestern region. It is by far the largest in size (44% of land area) and the smallest share in (5%) population with 44 percent of poor population. The economy of the province is largely based upon livestock, agriculture, fisheries and production of natural gas, coal, and minerals but still lags far behind other parts of Pakistan. Although rich in mineral resources, but its share is lowest as compare to other provinces. All the indicators of welfare have the lowest values as compare to other provinces as perceived in Table 1. In this scenario, the projects of CPEC have tremendous importance for socio economic development of this vulnerable region. In Table 5 a composite index of social welfare is presented indicating a 6.42 percent growth due to hefty investment in this region while for growth rates for its three dimensions are: growth in education index 4.74 percent, health index 6.33 percent and housing index 9.4 percent. As it is earlier mentioned that most of its districts are placed in low ranking in terms of social welfare, this project will have

significant impact in all dimensions of wellbeing and contribute in poverty alleviation of this neglected region.

## **V. Conclusions**

The China-Pakistan Economic Corridor will take along a massive socio-economic impact and it will play a significant role in economic development of both the countries through one belt. The aim of this study is to forecast the net impact of CPEC projects on social welfare across four provinces and all districts of Pakistan, particularly focusing on its three routes. It is based on data from ‘The Pakistan Social and Living Standards Measurement (PSLM) Survey 2014-15’ and methodology is based on the simplest forecasting model. For measuring social welfare index three dimensions related to access to education (net enrolment in primary, middle and matric), health (child and maternal health) and housing (quality of roof, safe water delivery system and gas as cooking fuel) are taken. To further see the multiplier impact of CPEC projects across Pakistan, two composite indices are constructed depicting present scenario and CPEC scenario.

The results related to net impact of CPEC projects is expected to be a win-win initiative, as this enormous project will increase geographical connectivity and create millions of employment opportunities for the local people, resulting an increase in household income. The development vitality of this project indicates that there will be 5.21 percent growth in social wellbeing in Pakistan, up till 2020. At provincial level the impact of highest growth in social welfare can be ranked as; in Balochistan (6.4 percent), Sindh (6.31 percent), KP (5.19 percent), and Punjab (3.5 percent), respectively. The net impact can also be depicted by its three dimensions of social welfare as; education 3.85 percent, health 4.74 percent and housing 8.6 percent, also indicating high growth in terms of housing conditions. While discussing the social welfare impact at districts level, it is important to note that those districts which have high level of

poverty or low ranking in wellbeing will significantly improve quality of life relative to other districts. In addition, districts which are located on its three routes also depict significant growth in its welfare dimensions.

Finally, it can be concluded that China had already invested \$14 billion in 30 early harvest projects, 16 have been completed or are under construction. The realization of CPEC is a manifestation of the shared dream of unprecedented prosperity for the region.

## References

- Abid, M., and Ashfaq, A. (2015). CPEC: Challenges and Opportunities for Pakistan. *Pakistan Vision*, 16(2).
- Aqeel, M. (2016). Impact of China Pakistan Economic Corridor. Unpublished degree thesis, BBA International Business. ARCADA.
- Alkire,S., Foster, J., Seth,S., Santos, M.E. Roche, J.M. and Ballon,P.(2015). *Multidimensional Poverty Measurement and Analysis*. Oxford University Press.
- Armstrong, J. Scott, ed. (2001). *Principles of Forecasting: A Handbook for Researchers and Practitioners*. Norwell, Massachusetts: Kluwer Academic Publishers.
- Bengali, K (2015) *China-Pakistan Economic Corridor? The Route Controversy*, Chief Minister's Policy Reform Unit, Government of Balochistan.
- Bhattacharyay. B.N; Masahiro. K and Raiat. N.(2012) *Infrastructure for Asian Connectivity*. Asian Development Bank Institute.
- BISP (2016) *Poverty Profile. Population of Pakistan: An Analysis of NSER 2010-11*. Benazir Income Support Programme (BISP).
- BISP (2016) *Youth and Employment Participation. Population of Pakistan: An Analysis of NSER 2010-11*. Benazir Income Support Programme (BISP).
- CID (2016) *Center for International Development at Harvard University (CID)*
- Hussain, E and Ali,G (2015) *China-Pakistan Economic Corridor*, Daily Times, accessed February 28, 2015, <http://www.dailytimes.com.pk/opinion/28-Feb-2015/pakistan-China-economic-relations>.

- Gilbert, J and Nilanjan, B .(2012) Socio-economic Impact of Regional Transportation Infrastructure in South Asia. Edited, Infrastructure for Asian Connectivity. Asian Development Bank Institute.
- Goldstein, A. (2005). *Rising to the Challenge: China's Grand Strategy and International Security*. Stanford University Press.
- Habib, S, Fazal, R. Farkhanda, J. and Adeel, K. (2015) Assessing Ex-ante Socioeconomic Impact of China Pakistan Economic Corridor (CPEC) Across the Zone of Influence. Proceedings of International Conference on CPEC, GC University, Lahore. December 09-10.
- Hamid, N.and Sarah, H (2012) The Opportunities and Pitfalls of Pakistan's Trade with China and Other Neighbors, *The Lahore Journal of Economics*, (September, 2012).
- Haq, R and Zia, U. (2013) Multidimensional Wellbeing: An Index of Quality of Life in a Developing Economy. *Social Indicator Research*. Volume 114, No.3.
- Haris, M (2015). Identifying investment sectors along Pak China economic corridor, *Memoir of International Academic Symposium on China Pakistan Economic Corridor*, (May 2015):39-45.
- Hyndman, R.J. (2014). *Forecasting: Principles and Practice*. University of Western Australia.
- Maggino, F. and Zumbo, B.D. (2012). Measuring the quality of life and the construction of social indicators. In K. C. Land, A. C. Michalos, & M. J. Sirgy, eds. *Handbook of social indicators and quality of life research* Springer, pp. 201– 238.
- Mattson, J. (2011). Transportation, distance, and health care utilization for older adults in rural and small urban areas. *Transportation Research Record: Journal of the Transportation Research Board*.(2011): 192-199.
- Midgley, J. (2013). *Social Development: Theory and Practice*. London: SAGE.
- Murtagh, F., and Heck, A. (1987). *Multivariate Data Analysis*. D. Reidel, Netherlands.
- Nau, R. (2014). *Review of Basic Statistics and the Simplest Forecasting Model: The Sample Mean*. Fuqua School of Business, Duke University.
- Pakistan, Government of. (2015). *The Pakistan Social and Living Standards Measurement (PSLM) Survey 2014-15*. Pakistan Bureau of Statistics, Islamabad.

- Pakistan, Government of. (2016). Multidimensional Poverty in Pakistan. Ministry of Planning, Development and Reforms. Pakistan.
- Shakeel A. Ramay,(2015). China Pakistan Economic Corridor-A Chinese Dream Being materialized through Pakistan, SDPI.
- Small, A. (2015). The China Pakistan Axis: Asia' New Geopolitics. Oxford University Press.
- Tong, L. (2015). CPEC Industrial Zones and China Pakistan Capacity Cooperation.[http://issi.org.pk/wp-content/uploads/2015/12/Liang-Tong\\_3435\\_SS\\_41\\_20142015.pdf](http://issi.org.pk/wp-content/uploads/2015/12/Liang-Tong_3435_SS_41_20142015.pdf)
- UNDP (1990). Human Development Report 1990. The United Nations Development Programme (UNDP).
- UNDP (2014) Sustaining Human Progress Reducing Vulnerabilities and Building Resilience; Technical notes. Human Development Report 2014. The United Nations Development Programme (UNDP), One United Nation Palaza, New York.
- UNDP (2015) Work for Human Development, Human Development Report 2015. The United Nations Development Programme (UNDP), One United Nation Palaza, New York, NY 10017.
- Howard,W. and Edoardo, M.(2004) Books, buildings, and learning outcomes: An impact evaluation of World Bank support to basic education in Ghana (Washington DC: World Bank, 2004).
- Xudong, Z (2015) China Today (February 2015):41-43.

### Appendix A. Social Welfare Ranking<sup>a</sup>, Poverty and Unemployment in Districts of Pakistan

Districts	Social welfare Ranking	Poverty Level (%)	Unemployment Rates (Male)
Karachi	1	11.01	28.1
Lahore	2	10.19	23.7
Rawalpindi	3	7.34	22.3
Haiderabad	4	36.62	40.7
Jhelum	5	6.34	26.7
Gujrat	6	8.83	27.2
Gujranwala	7	13.28	22.2
Attock	8	6.77	23
Chakwal	9	9.87	18.7
Peshawar	10	32.15	27.6
Abbotabad	11	7.32	29.9
Sargodha	12	14.07	46
Sialkot	13	5.63	27.1
Faisalabad	14	12.86	34.4
Sahiwal	15	NA	46.5
Noshehra	16	NA	NA
Multan	17	39.41	36.4
Mandi	18	9.85	46.2
Haripur	19	10.55	27.3
Dadu	20	50.20	24.3
Mardan	21	36.41	27.3
Sheikhupura	22	15.54	33
Lower Dir	23	44.41	37.4
Charsadda	24	37.53	29.6
Nankana	25	21.13	53.5
Toba Tek	26	12.19	34.3
Malakand PA	27	33.72	18
Sakhrur	28	NA	39.4
Jamshoro	29	NA	39.1
Naushehro	30	57.26	52.8
Okara	31	21.03	48.1
Swabi	32	46.05	21.9
Swat	33	42.24	48.3
Khanewal	34	20.20	58.6
Layya	35	36.37	19.1
Gawadar	36	50.30	71
Khushab	37	NA	34.3

Districts	Social welfare Ranking	Poverty Level (%)	Unemployment Rates (Male)
Kohat	38	32.97	33.8
Matiari	39	61.45	52.9
Hafizabad	40	15.6	48.3
Chitral	41	28.77	41.6
Mianwali	42	22.83	3.2
Hungo	43	NA	35.1
Mastung	44	24.98	68.6
Larkana	45	55.04	29.8
Kalat	46	41.45	76.1
Mansehra	47	33.08	27.1
Chiniot	48	20.07	45.2
Quetta	49	20.34	38.4
Pakpattan	50	28.81	40.6
Narowal	51	11.49	51.5
Vehari	52	20.17	51
Kasur	53	20.35	22.7
Jhang	54	21.37	55.7
Karak	55	30.42	30.7
Lodharan	56	29.24	47.2
Buner	57	39.15	26.4
Mirpur Khas	58	47.93	2.8
Tandu	59	NA	16.4
Bannu	60	38.17	35.9
Khairpur	61	53.81	34.6
MuzafarGarh	62	49.18	40.7
BahawalNaga	63	15.30	34.7
Rahim	64	44.15	65
Badin	65	67.15	38.7
Bhakar	66	21.56	28.6
Sanghar	67	NA	22.1
D.I Khan	68	44.82	37.6
Tank	69	51.28	35.7
S.Benaziraba	70	NA	50.4
Lakki Marwat	71	54.36	49.9
BahawalPur	72	29.52	34.7
Shahdatkot	73	NA	NA
Sibbi	74	48.22	53.1

Districts	Social welfare Ranking	Poverty Level (%)	Unemployment Rates (Male)
Umerkot	75	66.00	43.4
Khuzdar	76	47.29	65.2
Shikarpur	77	65.93	33
TandoMuham	78	70.43	44.3
Ketch	79	46.95	51.6
D.G.Khan	80	NA	40.2
Barkhan	81	46.06	37.9
Noshki	82	NA	68.3
Zhob	83	46	56.7
Upper Dir	84	57.14	58
Batagram	85	21.7	33.9
Ghotki	86	54.07	48.1
Punjgur	87	38.16	91
Jaffar Abad	88	58.63	52.1
Jacobabad	89	59.75	28.8
Ziarat	90	37.66	60.9
Lasbela	91	61.39	49
Killa Saif	92	14.04	1.8
Kharan	93	38.95	87.3
RajanPur	94	60.05	40.7
Loralai	95	38.56	56.7
Musa Khel	96	50.77	44
Kashmor	97	44.49	30.3
Pishin	98	38.51	66.2
Tharparkar	99	54.16	22
Kachi (Bolan)	100	55.25	78.5
Nasir abad	101	60.97	NA
Awaran	102	42.90	88.8
Shangla	103	53.13	61.4
Sheerani	104	NA	80
Kohlu	105	45.13	73.6
Sajwal	106	NA	NA
Jhal Magssi	107	57.99	71.4
Thatta	108	72.97	57.8
Washuk	109	58.22	88.6
Hamai	110	44.65	73
Chagai	111	58.67	79.3
Kila Abdullah	112	40.53	55.1

Districts	Social welfare Ranking	Poverty Level (%)	Unemployment Rates (Male)
Tor Ghar	113	NA	NA
Dera Bugti	114	55.56	82.7
Kohistan	115	50.84	66.1

Source: BISP (2016) for Poverty and unemployment estimates.

- a. 'The Pakistan Social and Living Standards Measurement (PSLM) Survey 2014-15'

