Impact of Chinese Investment on Afghanistan Economic Growth

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Abstract: The purpose of this is study to examine the impact of foreign direct investment (FDI) on GDP growth in Afghanistan with particular emphasis on Chinese FDI under the Belt and Road economic strategy. Belt and Road Initiative (BRI) assumed to be benefiting a poor country like Afghanistan; the newly developed ARDL-bound testing procedure is used for the period of (2006 – 2016). The result show that long run cointegration holds between economic growth and Chinese investment. Granger causality results indicate that there is bidirectional short and long run causality between economic growth and Chinese investment. These finding are supported by impulse response analysis and suggest the applicability of modernization theory to explain economic growth and Chinese investment relationship. The results also reveal that agriculture and services has a deteriorating impact on economic growth. Moreover the importance and feasibility of Wakhan corridor and link directly Afghanistan with China, also the expending of CPEC to Afghanistan for discovering easy route to middle Asia and Europe.

Keywords: China, Foreign direct investment, ADRL, Afghanistan, CPEC

I. Introduction

Landlocked Afghanistan lies in the heart of Asia. It links three major cultural and geographic regions: the Indian subcontinent to the southeast, Central Asia to the north, and the Iranian Plateau in the west. Even today Afghanistan continues to share cross-border populations, trade links, labor migrations, and cultural ties that transcend current nation-state boundaries.

Afghanistan has an agriculture base economy; mostly Afghans are involved in agriculture with less farming land, lack of water and traditional or poor quality agriculture equipment. Afghans are living under the poverty line and facing long term political and economic instability.

China has the second largest economy in the world and borders Afghanistan; therefore, officials in Kabul believe that China is the key to Afghanistan’s economic future. (Zyck, 2013) Beijing has spent $58 million from 2002 to 2010 on soft power projects in Afghanistan. These projects included humanitarian aid, an irrigation project, and the establishment of a Confucius Institute in Kabul, and a hospital construction and rebuilding project, while these projects have provided substantial improvement of services in their targeted areas.

The PRC granted tariff exclusion on 95 percent of Afghanistan’s imports to China, this agreement will provide a bigger market for Afghan agricultural products and support the licit Afghan economy. Economic performance of a country is influenced by several factors for example import/export, foreign direct investment, taxation system, law and order government policies, employment level and inflation. China’s long-term investment proves to the Afghan government and people that China is interested in the long-term success of the country, but it also limits what China can do in the short term (Brian C. James, 2013).

Shanghai Cooperation Organization (SCO) was deeply concerned about the illicit aspects of the Afghan economy. SCO held a special conference on Afghanistan in March 2009 that
focused on stemming the flow of narcotics and terrorism from Afghanistan. The proponents of Afghanistan joining CPEC in particular and CHNFDI in general have argued that participating in this megaproject will bring the following benefits to the country. First, the new infrastructure within Pakistan could give Afghan businesses and investors’ access to the consumer market in South Asia, thus reducing the cost of imports and increasing exports to the region. This could help Afghanistan enhance its trade with regional countries; thereby stabilizing its economy infrastructure can make quick changes and increase the living of people.

After the fall of Taliban regime China provided Afghanistan with approximately $240 million in aid over twelve years between 2001 and 2013. In contrast, in 2015, it pledged to provide $327 million by the end of 2017. Chines government sign a huge hydroelectricity project to produce 2,800 megawatts on the Kunar River has been under discussion for a long time. But implementing this project is not straightforward because there is no water sharing treaty between the two countries, (Mr Khalil. 2014). Railway route is the first priority for Silk Road projects implementation, also there initially invested $ 400 million for the oil exploration in these fields for the development of mining industry, finally investment in mining sector is recorded USD 2.9 billion. Another housing project in Kabul is signed with Chinese company will fund 10,000 apartments which are worth USD 3000 million.

Sino-Afghan employment has previously touched over $700 million, China – Afghan Trade volume highlights certain facts which points towards the environment conducive for China’s business interests. China’s spread capacity augmented from $19.91 million to $704 million; there is small but significant increase in China’s import volume which increased from $.08 million to $11.7 million (Huasheng, 2012, p.7).

President Xi said that, he was all set to work with his Afghan counterpart towards, “a new era of cooperation in China-Afghanistan relations and take development to a new depth and breadth” Panda ( 2014), China has lot at stake in Afghanistan, security of its western autonomous region (Xinjiang) being the most significant. Consequently, restoration of peace and stability in Afghanistan is in the interest of China, besides this being vital for Afghan masses.

According to Andrew Small, a US based Chinese expert, “China is the only actor which can foot the level of investment needed in Afghanistan to make it succeed and stick it out”. The Metallurgical Corporation of China (MCC) and Jiangxi Copper Corporation (JCCL) agreed to make the single largest foreign investment of $3.5 billion in Afghanistan by winning a tender to develop Mis-e-Aynak in Logar Province, what geologists believe is the world’s second largest undeveloped copper deposit. Afghanistan also has the abundant potential of hydroelectricity, which Chinese companies can tap and sell in Pakistan.

In Afghanistan no study has been conducted so far to fill the gap by analyzing the empirical relationship between growth and CHNFDI, by using data for the period 2006 – 2016. The rest of paper is organized as follows. Section 2 discusses a brief introduction of Afghan economy,
Belt and Road situation and how to get benefit from Belt and Road. Section 3 explains the theoretical framework. Section 4 elaborates econometric methodology. Section 5 provides estimation of the model along with its interpretation. Final section concludes the paper and suggests policy recommendation.
II. Economy of Afghanistan According to Economic Indicators

Afghanistan economy is mostly depended on foreign aid. After 9/11 USA included NATO among countries control over Afghanistan, economic growth gradually start and plenty foreign direct investment took place in dissimilar infrastructure and administrative projects. The main contributor to GDP growth in Afghanistan is agriculture 23 percent, services 21.1 percent and industries 55.9 percent.

(i) Gross domestic product growth

Is considerably good and it’s increasing year to year which can be considering significant growth from 2006 – 2017. The gross domestic product (GDP) in Afghanistan expended 5.4 percent in 2006 from previous year, respectively 13.3 percent in 2007 year which is increased double compare to previous year. Average growth rate is 6.96 percent from 2006 until 2017. Reaching an all-time high is 20.60 percent in 2009 and a record low of 0.80 percent in 2015.

(ii) Gross domestic product per capita

The gross domestic product per capita of Afghanistan is moderately increasing, reaching all-time high of 633.70 USD in 2013 and a record low of 364.10 USD in 2004. GDP per capita in Afghanistan averaged 511.02 USD from 2002 until 2017; last record was 618.30 in previous year.

(iii) Consumer price index

CPI in Afghanistan decreased to 110.80 Index Points in May from 110.90 Index Points in April of 2018. Consumer Price Index CPI in Afghanistan averaged 108.61 Index Points from 2015 until 2018, reaching an all-time high of 112.80 Index Points in January of 2018 and a record low of 103.60 Index Points in November of 2015.

(iv) Inflation rate

In Afghanistan was recorded at -1.10 percent in May of 2018. Inflation Rate in Afghanistan averaged 4.03 percent from 2005 until 2018, reaching an all-time high of 13.97 percent in April of 2011 and a record low of -18.39 percent in May of 2009.

(v) Unemployment rate 4 – 6%

Unemployment rate in Afghanistan remained unchanged at 8.80 percent in 2017 from 8.80 percent in 2016. Unemployment Rate in Afghanistan averaged 8.48 percent from 2006 until 2017, reaching an all-time high of 9.1 percent in 2006 and a record low of 6.70 percent in 2009.

(vi) The benchmark interest rate

Afghanistan was last recorded at 14.84 percent. Interest Rate in Afghanistan averaged 15.30 percent from 2007 until 2017, reaching an all-time high of 21 percent in the fourth quarter of 2007 and a record low of 14.84 percent in the first quarter of 2017.
III. Theoretical Framework

Theoretically, all foreign investment inflow affects many macroeconomic variables. Some of these variables are domestic income (GDP), domestic investment, inflation, and trade etc. In this study we take Chinese investment in Afghanistan under the Belt and Road policy, based on new economic geography theory this study has selected two variables, that is, economic growth and Chinese ODI to examine their interdependency with agriculture and services in Afghanistan.

3.1 Relationships between FDI and Belt and Road investment

i) New growth theory postulates that foreign investment has positive effects on the economy of the host country (such as productivity gains, technology transfers, introduction of new production processes, managerial skills and know-how and employee training) and in general, it is a significant factor in modernization the host country’s economy and in promoting growth.

ii) The vision document for OBOR goes well beyond infrastructure, envisioning closer coordination of economic development policies, harmonization of technical standards for infrastructure, removal of investment and trade barriers, establishment of free trade areas, financial cooperation and people to people bonds involving culture and academic exchanges, personnel exchange and cooperation, media cooperation, youth and women exchanges and volunteer services.

3.2 What could be the impact of BRI?

Belt and Road could stimulate Asian and global economic growth and make it more sustainable. In particular, countries along the corridor—especially those with underdeveloped infrastructure, low investment rates, and low per capita incomes—could experience a boost in trade flows and benefit from infrastructure development.

3.3 Why BRI?

Some opinion that China’s plan to ensure markets for its growing excess capacity in the construction of industries and economic expansion and domestic investment slow. While it is true Silk Road need needs a lot of investment, modest share of China’s $5 trillion annual investments back home. Investment of $1 trillion over 10-15 years is not going to absorb a lot of China’s overcapacity. There are at least four reasons why BRI can succeed better than individual fending for themselves: network effects, finance, leadership and China’s current stage of economic development.

3.4 The situation One Belt One Road

We may look into the past of to examine the existing record of daring ambitions and investment related to developing connectivity in Afghanistan. Based on such an overview, starting with a look at Pakistan’s plans in the mid-1990s to turn Afghanistan into a corridor of trade with Central Asia, it is hard to conclude that the country might play a significant role in the realization of the One Belt, One Road concept. Working toward conflict resolution or at least to mitigate problems in Afghanistan is going to remain crucial in containing spillover effects that could disrupt the New Silk Road elsewhere.
Beijing’s investment goal in Afghanistan is stability, and China has aimed to achieve that goal by enhancing the economy and security of Afghanistan. If Afghanistan were to become unstable, it would threaten Chinese investments in Central Asia and, more importantly, domestic stability in China.

Robert Kaplan wrote in the New York Times that “the problem is that while America is sacrificing its blood and treasure, the Chinese will reap the benefits. The U.S. and ISAF goal of securing Afghanistan in order to stabilize it has only been partially successful. The economics of the country are in disarray and the future stability of the country remains in doubt. China’s free riding on U.S. efforts should be seen as a positive outcome and not as a bitter pill. Core issue which may disrupt the successful implementation of Belt and Road in Afghanistan, if not consider.

i) Political instability within system and lack of common goal cooperation between powerholder parties to work for stable Afghanistan ii) ethnicity division (Pashtoon, Tajik, Hazar and Uzbek) iii) terrorism in the profile of Taliban IS included many local groups, role of neighbor countries and direct involvement in internal issues and strongly support for militant iv) Government ineptitude and high close Corruption in key organization vi) interest of United State of America and NATO among courtiers vii) culture change and conflict risk assessment viii) complex geo-strategic location

3.5 Afghanistan how to get benefit from Belt and Road

After nearly sixteen years of international engagement since 9/11, Afghanistan has made progress in many fields, but still has a long way to go in creating durable peace and a stable economy. The international community has invested heavily in restoring Afghanistan’s security, economy, and governance and the rule of law. It is very crucial for Afghan government and active stakeholders how to utilize Belt and Road investment for the reconstruction of licit economy and turn back Afghanistan to as a transit hub, in general Afghanistan get benefit from BRI in two core areas.

Economic gain through internal and external source and become international economic player and can Strengthen political and diplomatic relationship within Asia and around the world e.g.(SCO)

Afghanistan’s geography connects it to Central and South Asia and can serve as a conduit for the transport of goods, or as a roadblock for commerce and energy transportation.

3.6 Afghanistan government

The first priority of the Afghan government should be to reduce dependence on foreign aid, Immediate priorities are to open up trade flows between China, Iran and Pakistan, reduce bureaucratic and corrupt impediments to border trade, establish three to four free-trade areas along the border of Afghanistan, and organize cotton caravans for transport of cotton from Central Asia to the ports of Gwadar or Chabahar. The United States, China, or European Nations could champion this project readily and successfully.

3.3.1 Energy security

Afghanistan’s geographic location and stability currently affect China’s access to hydrocarbon resources from Central Asia, and could affect China’s and South Asia’s long-term access to hydrocarbons. Beijing has taken significant action to fortify Chinese energy security by developing Central Asian energy production and infrastructure. Beijing accomplished this by increasing SOE investment in Central Asia, and built numerous pipelines in order to ensure unfettered access to the natural resources of the region.

3.3.2 The Gwadar port project (CPEC)

From Afghanistan’s viewpoint, a deep-water port at Gwadar and the associated infrastructure in Pakistan would give Afghanistan access to international markets. Road and rail links from Pakistan into Afghanistan would promote the development of Afghan mineral wealth and of the overall Afghan economy. With links established to the sea, goods like cotton from Central Asia could reach international markets as well. North south transport of goods would also supply a steady stream of income for Afghanistan. (Starr, “Finish the Job,” 18–19, 24–26.)

3.3.3 The port of Chabahar, Iran

These infrastructure projects will allow goods to flow from western and southern Afghanistan to the port of Chabahar in South-East Iran. In June 2013, a Chinese company made a bid to take control of the development and operations of the port. This development enhances the possibility of an Iran–Pakistan gas pipeline that would create an energy corridor from Iran into China. This could further alleviate China’s reliance on maritime imported energy.

3.3.4 The TAPI pipeline

The TAPI, Turkmenistan–Afghanistan–Pakistan–India pipeline, began in the 1990s with the goal of connecting the Caspian Sea to India. The intent was to supply South Asia with energy for its growing populations and alleviate chronic energy shortages. The project would benefit the nations involved by providing energy, jobs, and fees to energy-starved markets. China and Turkmenistan sign an agreement on September 3, 2013 to secure more gas resources for China, but also granted CNPC and China the primary decision on the future of the TAPI pipeline.

3.3.5 Transportation

Lack of infrastructure has prevented investment and growth in Afghanistan to the present day. Afghanistan’s development hinges on infrastructure development because it sits on the intersection of North-South and East-West routes that could connect Eurasia. The U.S. State Department started the “New Silk Road” strategy as way of promoting trade and fortifying Afghanistan against terrorist elements

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2 David Finkelstein. “China and Central Asia:
IV. Econometric Methodology

4.1 Unit Root Test

The reliability of statistical inference depends on the distinction between stationary and non-stationary (or integrated) time series. Shocks to a stationary time series are momentary due to constant mean and variance over time. In turn non-stationary time series has time dependent mean and variance giving rise to permanent fluctuations after shock. Keeping in view the importance of peculiar characteristics of time series, it is necessary to check the stationary properties of the variable using appropriate unit root test. These tests include inter alia ADF, Phillips-Perron and Ng-Perron tests.

4.2 Cointegration Test

To investigate long-run cointegrating relationship among variables several econometric techniques have been proposed in the literature. Univariate cointegration examples include Engle and Granger (1987) and the fully modified OLs procedure of Phillips and Hansen (1990). With regard to multivariate cointegration, Johansen (1988) and Johansen and Juselius (1990).

The so-called Autoregressive Distributed Lag (ARDL) model is also deals with single cointegration analysis and is introduced originally by Pesaran and Smith (1995).

\[ H_0: \alpha_1 = \alpha_2 = \alpha_3 = 0 \text{ (there is no cointegration)} \]

\[ H_1: \text{at least one } \alpha \text{ is not equal to zero (there is cointegration)} \]

\[
\Delta Y_t = \beta_0 + \sum_{i=1}^{n} \beta_i \Delta y_{t-i} + \sum_{i=0}^{n} \delta_i \Delta x_{t-i} + \varphi_1 y_{t-1} + \varphi_2 x_{t-1} + \mu_t \tag{1}
\]

Short-run coefficients: \( \beta_i, \delta_i \)

ARDL long-run coefficients: \( \varphi_1, \varphi_2 \)

Disturbance (white noise) term: \( \mu_t \)

\[ Y_t = \alpha_0 + \alpha_1 S_t + \alpha_2 CHNFDI_t + \alpha_3 A_t + \mu_1 \tag{2} \]

\[
\Delta Y_1 = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_2 S_{t-1} + \alpha_3 CHNFDI_{t-1} + \alpha_4 A_{t-1} + \sum_{i=1}^{p} \theta_i \Delta Y_{t-i} + \sum_{j=1}^{q} \theta_j S_{t-j} + \sum_{l=1}^{m} \theta_l \Delta CHNFDI_{t-l} + \sum_{k=1}^{n} \theta_k A_{t-k} + \mu \tag{3} \]
4.3 Granger Causality

Cointegration only depicts the presence or absence of causality; it does not show the direction of causality among the variables. Once it is established that variables are cointegrated we can examine the direction of both short and long run causality between them using Granger causality test. The Granger causality test in vector error correction model (VECM) format can be expressed as follows

\[ \Delta Y_t = \alpha_0 + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \sum_{j=1}^{n} \alpha_2 \Delta S_{t-j} + \sum_{k=1}^{o} \alpha_3 \Delta CHNFDI_{t-k} + \sum_{l=1}^{p} \alpha_4 \Delta A_{t-l} + \eta_1 ECT_{t-1} + \mu_1 t \]  

(3)

\[ \Delta S_t = \beta_0 + \sum_{i=1}^{m} \beta_1 \Delta S_{t-i} + \sum_{j=1}^{n} \beta_2 \Delta Y_{t-j} + \sum_{k=1}^{o} \beta_3 \Delta CHNFDI_{t-k} + \sum_{l=1}^{p} \beta_4 \Delta A_{t-l} + \eta_2 ECT_{t-1} + \mu_2 t \]  

(5)

\[ \Delta CHNFDI_t = \gamma_0 + \sum_{i=1}^{m} \gamma_1 \Delta CHNFDI_{t-i} + \sum_{j=1}^{n} \gamma_2 \Delta S_{t-j} + \sum_{k=1}^{o} \gamma_3 \Delta Y_{t-k} + \sum_{l=1}^{p} \gamma_4 \Delta A_{t-l} + \eta_3 ECT_{t-1} + \mu_3 t \]  

(6)

\[ \Delta A_t = \delta_0 + \sum_{i=1}^{m} \delta_1 \Delta A_{t-i} + \sum_{j=1}^{n} \delta_2 \Delta S_{t-j} + \sum_{k=1}^{o} \delta_3 \Delta Y_{t-k} + \sum_{l=1}^{p} \delta_4 \Delta CHNFDI_{t-l} + \eta_4 ECT_{t-1} + \mu_4 t \]  

(7)

*Where ECT is error correction term, and \( \mu's \) are error terms which are assumed to be uncorrelated. \( n's \) are the coefficients of error correction terms and denote speed of adjustment of \( \Delta \ln Y_t, \Delta \ln CHNFDI_t, \Delta \ln S_t, \Delta \ln A_t \), towards long run equilibrium. Where the coefficients on \( \Delta \ln Y_{t-i}, \Delta \ln CHNFDI_{t-j}, \Delta \ln S_{t-k}, \) and \( \Delta \ln A_{t-l} \) are expected to capture the short run dynamic of the model.

V. Data and Estimation of the Model

5.1 Data Overview

The study has applied annually time series data over the period of (2006 – 2016). Growth is measured by real GDP per capita and it is taken in millions of US dollar. BRI is the Chinese direct investment in Afghanistan in univariate projects like infrastructure, mining, oil and gas, financial cooperation including grant aid data are taken in millions of US dollars. Services industries data is considered all kinds of services like (financials, commercials, tourism, transportations, export & import and tourism) taken in millions of dollar. Agriculture
(forestry and fishing value added constant 2010 US) data is also taken in millions of US dollar; all variables are taken in normal from.


Table 1 Descriptive statistics and correlation

<table>
<thead>
<tr>
<th></th>
<th>Growth</th>
<th>Service</th>
<th>CHNFDI</th>
<th>Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>516.983</td>
<td>8377.962</td>
<td>639.402</td>
<td>4063.052</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>130.839</td>
<td>2687.568</td>
<td>1436.398</td>
<td>563.956</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.629</td>
<td>-0.294</td>
<td>2.730</td>
<td>-0.794</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.0534</td>
<td>1.580</td>
<td>8.694</td>
<td>2.117</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>1.137</td>
<td>1.083</td>
<td>28.535</td>
<td>1.515</td>
</tr>
</tbody>
</table>

Correlation

<table>
<thead>
<tr>
<th></th>
<th>Growth</th>
<th>Services</th>
<th>CHNFDI</th>
<th>Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td>1</td>
<td>0.8950</td>
<td>0.2753</td>
<td>0.8228</td>
</tr>
<tr>
<td>Services</td>
<td>0.8950</td>
<td>1</td>
<td>0.0769</td>
<td>-0.0986</td>
</tr>
<tr>
<td>CHNFDI</td>
<td>0.2753</td>
<td>0.0769</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>0.8228</td>
<td>0.8242</td>
<td>-0.0986</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1 provides descriptive statistics of the variable along with correlation matrix of the variables. Standard deviations of the variables indicate that BRI is highly volatile and followed by Growth, Agriculture and Services. Correlation results show that all variables are positively correlated with each other and these correlations are statistically significant. There is high correlation between BRI and growth (0.2753) and followed by services (0.8950) and agriculture (0.8242).

5.2 Unit Root Test

Table 2 reports unit root results. Both BRI and income growth (G) are non-stationary at levels but stationary at second differences. Thus these two variables are integrated of order two i.e. I (2). Since not all variables have the same level of integration, we will apply ARDL bounds testing technique to find long run cointegration relationship among these variables.

5.3 Cointegration Analysis

To ascertain the existence of long run cointegration relationship among growth, BRI, services and Agriculture, ARDL bounds testing approach is applied one data set. Table 3 provides the estimated results. To test the null hypothesis of no cointegratoin i.e. $H_0 : \alpha_1 = \alpha_2 =$
**α3 = 0**, Wald test is applied the computed value is exceed the upper critical bound value at 5% level of significance so the null hypothesis of the no cointegration is rejected. We may there for conclude that there exist long run relationship among the variables. \((R^2)\) are reasonably highly, which indicates that explanatory variable have 0.992 % variation in dependent variable. High statistically significant \(F\) values indicate that the model fit the data well. To test the normality of the data Jarque – Bera (JB) test is applied, the values of JB test are statistically insignificant this shows that data is normal. To check the serial correlation in the model Breusch – Godfrey LM test is applied. Statistically insignificant values of LM test show that a serial correlation problem is no present in the model. Similarly, to diagnose (conditional) heteroscedasticity issue in the model both White and ARCH tests are applied, which indicates that heteroscedasticity problem does not exist in the model as the values of these tests are statistically significant at chosen level of significance. Moreover, statistically insignificant values of Ramsey REST test indicates that there is no model misspecification bias problem in the models.

### Table 2 Unit Root Test Augmented Dicky-Fuller Test (ADF)

<table>
<thead>
<tr>
<th></th>
<th>Level</th>
<th>1 diff</th>
<th>2 diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Y)</td>
<td>-3.3251</td>
<td>-2.6559</td>
<td>-4.666**</td>
</tr>
<tr>
<td>(S)</td>
<td>0.2786</td>
<td>-2.1764</td>
<td>-5.3775**</td>
</tr>
<tr>
<td>CHNFDI</td>
<td>-2.8054</td>
<td>-2.9380</td>
<td>-3.0939*</td>
</tr>
<tr>
<td>(A)</td>
<td>-3.4564</td>
<td>-5.999*</td>
<td>-5.5573**</td>
</tr>
</tbody>
</table>

*, ** and *** implies significant 10%, 5% and 1% respectively..

Through unrestricted VAR estimation we found that one leg is appropriate for our model estimation; AIC and SC values are the lowest. Table show the results of lag selection criteria

### Table 3 Leg selection criteria

<table>
<thead>
<tr>
<th>Lag</th>
<th>LogL</th>
<th>LR</th>
<th>FPE</th>
<th>AIC</th>
<th>SC</th>
<th>HQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2.795694</td>
<td>NA</td>
<td>0.039321</td>
<td>-0.399043</td>
<td>-0.377129</td>
<td>-0.446333</td>
</tr>
<tr>
<td>1</td>
<td>9.920901</td>
<td>11.08366*</td>
<td>0.010147*</td>
<td>-1.760200*</td>
<td>-1.716372*</td>
<td>-1.854780*</td>
</tr>
<tr>
<td>2</td>
<td>9.933058</td>
<td>0.016210</td>
<td>0.012880</td>
<td>-1.540680</td>
<td>-1.474938</td>
<td>-1.682550</td>
</tr>
</tbody>
</table>

*indicate that the leg order is selected by criterion

LR: Sequential modified LR test statistics (each test at 5% level), FPE: final prediction error, AIC: Akaike information criterion. SC: Schwarz information crieterion, HQ: Hannan-Quinn information criterian

### 5.4 Stability Checking

In order to check the stability of the long-run coefficients, the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) tests suggested by brown et al. (1975) are used. If the plots of CUSUM and CUSUMSQ statistics stay within the critical bounds of 5% level of significance, the null hypothesis of all coefficients in the given regression are stable and cannot be rejected. As can be seen in Figs.1 and 2, the estimated CUSUM and CUSUMSQ stay within the critical bonds indicating that all coefficients in the ARDL model are stable.
Figure 1-2. Stability of the model

Table 3 the results of ARDL bound testing approach

|                      |  
|----------------------|---
| $G_t = f(CHNFDI_t, A_t, S_t)$ |   
| Optimal lag length   | (1,1,2)  
| Wald statistics      | 21.92**  
| Constant             | -323.795** (-3.744)  

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\[ S_t = -0.018 (-2.103) \]
\[ A_t = 0.107*** (5.673) \]
\[ CHNFDI_t = 0.017** (2.252) \]
\[ R^2 = 0.992 \]
\[ F\text{-statistics} = 69.006 \]
\[ JB\text{ Test} = 0.519 (0.771) \]
\[ LM\text{ test} = 0.569 (0.6837) \]
\[ White\text{ test} = 0.369 (0.8673) \]
\[ ARCH(1)\text{test} = 0.024 (0.8814) \]
\[ Ramsey\text{ RESET test} = 3.4886 (.2027) \]

*, ** and *** implies significant 10%, 5% and 1% respectively. P values are given in parentheses. Wald test significant at 5%.

**Table 4** The result Granger causality tests

<table>
<thead>
<tr>
<th>Null hypothesis</th>
<th>f-statistics</th>
<th>probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>S does not Granger Cause Y</td>
<td>0.351</td>
<td>0.724</td>
</tr>
<tr>
<td>CHNFDI does not Granger Cause Y</td>
<td>0.564</td>
<td>0.9139</td>
</tr>
<tr>
<td>A does not Granger Cause Y</td>
<td>0.023</td>
<td>0.978</td>
</tr>
</tbody>
</table>

*, ** and *** implies significant 10%, 5% and 1% respectively.

**5.5 Impulse Response Analysis**

Granger causality test only indicates the direction of causality; it cannot predict the sign of correlation. For this purpose, correlation tests or impulse response analysis needs to be carried out (Granger et al. 2000). In present study the impulse response are presented in Figs. 1 for the period of (2006 – 2016) respectively. The solid lines show the point estimate of the responses and the dashed lines show the upper and lower error bands. Yearly time period is taken on the horizontal axis while minimum and maximum lengths of the responses are given at the vertical axis. The responses are plotted for 10 periods following the occurrence of the shocks. The first row in figure shows the response of growth (Y) to one standard deviation unanticipated shock in services, CHNFDI and agriculture. The column in figure shows the response of Services, BRI and agriculture to one standard deviation shock in growth (Y).

The response of growth to BRI is less or more, growth is shoots down following the CHNFDI and then it starts increasing immediately but it will take 9 years for growth to return to its equilibrium position. It implies that after CHNFDI shock, growth goes down and then comes up quickly and recovers rapidly. It indicates that CHNFDI shocks have positive effect on economic growth in Afghanistan. Effect of services shocks on growth are no contradictory, growth falls up and after hitting the top it start decreasing and attains the equilibrium path after 10 period.
The response of agriculture to growth is negative, agriculture growth decrease immediately after growth shock, hit the minimum level and returns to equilibrium point after 8 periods. It postulates that growth shocks have negative impacts on agriculture growth and this effect last for midterm. The response of CHNFDI to growth shock is initially positive then it starts decreasing slowly and the positive effect of shocks completely gets equilibrium after 5 periods. The results of impulse response analysis support the result of granger causality that growth and CHNFDI cause each other. Moreover the effect of agriculture is more than services. To be brief, overall results indicate that growth, CHNFDI, services and agriculture is interlinked with each other.
VI. Results Discussion

This paper empirically examines the cointegration and causal relationship between growth, CHNFDI, services and agriculture in Afghanistan using annually data for the period 2006 – 2016. The estimated results indicate the long run cointegration relationship holds between CHNFDI and economic growth. Granger causality results indicate that there is bidirectional short run and long run causality between economic growth and CHNFDI. Long cointegration is also found between variables and statistically this cointegration is more significant. CHNFDI has positive effect on economic growth which indicates that government of Afghanistan should take measure to create opportunity for CHNFDI in the country. Although government more steps need to be taken especially politically to prevent terrorism and build friendly diplomatic relationship with neighbor countries. Further, government should remove the root cause of terrorism, like poverty, illiteracy income inequality, etc. To promote the stability in Afghanistan there is a pressing need for regional countries to play a vital yet neural role in Afghanistan through a regional co-operation mechanism.

The Silk Road and trilateral cooperation between China – Pakistan – Afghanistan, to fuel economic growth and craft better diplomatic relation among Pakistan and Afghanistan. With this regard Afghanistan can access to Indian see and Pakistan could find short way for Central Asia market. For attract foreign investment government should create the soft image of the country internationally and should increase public investment. Moreover, diversification opportunities may be provided particular to CHNFDI in general foreign investors with less risky environment.

Rather China than can get benefit from untapped minerals which is worth more than $1 trillion. Based on strategic location and historical importance of Afghanistan for Belt and Road can play key role for Chinese dreams, (Wakhan Corridor) and new Euro – Asian land bridge would connect China to Central Asia, Europe and warm waters of Gulf via Afghanistan.
**Policy Recommendation**

To effusively utilized and attract Belt and Road investment projects, Afghan government strongly need to provide clear map of all investment areas and classify the at most needs of nation. Following policy recommendations should be addressed for future accomplishment.

Initially- Afghan government must make available surety of security in particular for BRI projects and related matters in general for all foreign direct investment. Before many accidents happened during the project life which was kidnapped of Chinese labor in Ghazni province, delay of Mis-e-Ainak mine and worse security situation before starting projects in North of Afghanistan. Further more aware local peoples according to the benefit of projects and involve them to take part in projects, in order to solve the security problems easily.

Moreover- create a very friendly environment and avoid all risk and barriers up to possible extent like culture conflict, ease of business, tax policy and corruption. There are few core shortcoming in the administrative system of Afghanistan which is arises problem for foreign investments and make the economic environment unfeasible, it’s about the current system which is not well matching 21st century technology and innovation and some part of operation is still taking place in manual system.

Third- Turn Afghanistan to intra-regional transit hub and put neighbor countries interest equally, this will help for common cooperation and peace connectivity. Afghanistan strategic location is crucial for region and other stakeholders, also there is arising of threats from territory to other states like TIP militant group for China, Al-Qiada, and dominancy of India which is open threat for Pakistan also Iran role is vital.

Fourth- Kabul needs to demonstrate its leadership in Afghanistan’s economy. Mark a national plan/policy according to current situation particular for BRI projects and put them on first priority. Afghanistan still faces serious challenges in the areas of politics, economy and security and the very notable is licit economy and extreme poverty, government need to recall all power holder parties and find out any possible solution in order to serve the nation.

Fifth- Kabul should consider and embark on the construction of small infrastructure and energy projects to integrate with the “Belt and Road” and look for various financing mechanisms to finance these projects. In the extended path, Afghanistan should enhance its high-tech manufacturing capability to produce high value exports; otherwise, it will be difficult for the country to benefit from the economic opportunities created by “Belt and Road”
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