Foreign Direct Investment, Trade Performance, and Sustainable Development Goals: An Analysis of BRI Selected Countries

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Abstract
Over the last decades, foreign direct investment (FDI) in BRI (Belt and Road Initiative) economies has risen significantly. The study's primary purpose is to establish synergies among the FDI, Trade performance, and SDGs in selected BRI economies from 2009 to 2019. The mandatory theoretical concept is that foreign investment plays a vital role in the trade performance of BRI countries. We in this study empirically test this phenomenon. To accomplish our goal, we analyze the long-run experimental relationship between foreign investment and trade for specific BRI countries, including; China, India, Malaysia, Pakistan, Russia, and Turkey. Econometrics methods including Panel OLS, Random effect as well as GMM techniques are applied for estimation. The result of the study expresses that the role of foreign investment has a mandatory impact on the trade performance of these countries, and it is helpful to achieve the economic growth, infrastructure development, and climate protection Agendas of 2030 sustainable development goals. The milestone of this research should be analyzed as tentative and further work is most desirable.
Key Words: BRI Economies, FDI, Trade Performance, SDGs 2030

1. Introduction

International trade and foreign direct investment have gain importance to achieve higher productivity, regional connectivity, infrastructural development, and GDP growth in this age of Globalization. But, at the same time, we also observed the increase in the tariff rate to protect local industry and domestic employment (Enright, 2016). The USA-China trade war not only narrows the mutual gains from free trade but extends its repercussions on various regional economies (Kitano, 2018). China is a leading exporter of the World. To maintain its trade advantage, China is now adopting the model of regional connectivity and investing a considerable amount in Belt and Road Initiative project in member economies to develop their road infrastructure and energy resources (Abbas et al. 2020a) . China is now climbing to move its dependence on the USA into foreign markets in Asia, the Middle East, and Africa, with growth potential (Liu, Liu, Li, Li, & Wang, 2018).
On the other hand, the USA also has it's a similar plan with using the various cluster of the

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region. President of China Xi has taken the initiative as China BRI at his visit to Kazakhstan in 2013, at this time, he announced a project which will connect Asia, Middle East, Europe, and Africa (Cai, 2017). China's Project BRI has been accepted and gained an international identification with making agreements with more than 100 economies (Abbas et al. 2020b). Usually, most Chinese investments are shaped by loans and foreign direct investment (FDI) with some secret agreements with countries. Razzaq and Delpachitra, (2021) explained that the Belt and Road Initiative (BRI) is the primary indicator to drive the rapid growth of China's outward foreign direct investment (OFDI) across the BRI region.

Moreover, the United Nations Organization started Millennium development goals (MDGs) in 2000 to achieve its objectives until 2015, including eradicating poverty and hunger, creating employment, providing education. According to (MDGs report 2015), numbers have been dropped by 1.9 billion people in the 90s to 836 million in 2015 who pulled out of poverty. The assistance by developed countries has risen by $81 billion to $135 billion from 2000-2014. In 2015, United Nations presented blueprints of (SDGs) "Sustainable Development Goals" to continue the program for improved well as additional sustainable future called "Agenda 2030". The SDGs consist of 3 pillars: economic expansion, human expansion, as well as environmental protection. There are still 800 million people living less than $1.25 per day, as mentioned (UN's SDGs report 2018). In its annual report of 2017, World Bank noted that BRI contained-investment in infrastructural development of participating economies has successful outcomes in reducing shipping time, trade cost, unemployment, poverty, and ultimately spillover economies. (Hong, 2017) launched a "Capacity development Project" and analyzed the close link of BRI and SDG Agenda of 2030. He also shared some common points in economic progress, social and environmental dimension, and large-scaled regional development collaboration that could construct significant donations to accomplish the 2030 Agenda (Ali et al. 2021). According to Renwick et al. (2018), BRI contributes to the global infrastructure gap and helps achieve trade balance. As BRI would have significant cooperation in policy Co-ordination and facilities connectivity that provides the financial integration and unimpeded trade among the agreed countries. The ambition of BRI is to initiate the transaction and also offer a free flow of economic resources that helps to create regional economic cooperation and framework.

Foreign investment plays a vital role in promoting trade opportunities, productivity, and sustainable economic growth (Xinhua, 2018). BRI is the source to enhance connectivity and comprehensive approaches to sustainable development. However, lack of regional resources in infrastructure, countries are facing high costs and time in international trade (Yang et al. 2021). Developing countries are now needed to be developed soon. China has an excellent opportunity to invest in the region to cope with future trade tensions (Beeson, 2018). According to (2008), two-way foreign direct investment between the China and BRI economies has exceeded about $130 billion. China has grown on average by 5.2% investment from 2013 to 2018. China has earned about $40 billion from BRI countries (Yang, Pan, & Wang, 2018). Recently, China has established New China Bank to finance the BRI project (De Freitas, 2019).

Ohashi (2018) explained that BRI assists toward realizing the 2030 Agenda to eradicate poverty, improved entrance to healthcare, ensure food security, environmental protection, and also profitable corporation within nations through the trade liberalization among the

countries (Li, Jin, Qi, Shi, & Ng, 2018). The report explains critical perspectives on the impact of foreign investment on the trade performance of BRI countries by aligning China's BRI and UN's SDGs. To address this question and central aim, our study is concerned about the impact of foreign investment on the trade performance and achievement of SDGs of BRI countries. We focus on the goals of economic growth, infrastructure development and climate protection Agendas of 2030 sustainable development goals.

2. Literature Review

The Chinese vision of the BRI is a new shape of Globalization to initiate the efficient economic allocation of resources, promote international trade and develop regional economic cooperation. According to the Center for Strategic and International Studies (2013), the Belt and Road Initiative has six different economic corridors: the China-Mongolia-Russia Economic Corridor (CMREC), China-Central Asia-West Asia Economic Corridor (CCWAEC), China-Indochina Peninsula EconomicCorridor (CICPEC), Bangladesh-China-India-MyanmarEconomic Corridor (BCIMEC), China-PakistanEconomic Corridors (CPEC), and the New Eurasia Land Bridge Corridor, also known as the Second Land Bridge (NELB) (Huang et al. 2020), (Arsalan & Wang,2019).

Sustainable Development Goals has 17 main targets. One hundred sixty-nine targets and 243 indicators, and all are theoretically, methodologically, and reliably well designed and tested to function (Janoušková et al., 2018). Empirical research is initiated on the Belt and Road initiative and China's long-term vision in the Middle East (Mukwaya & Molde, 2018). Still, the empirical research of the BRI on infrastructure, trade performance, and achieving sustainable development Goals in host countries is minimal.

Razzaq and Delpachitra (2021) examine the impact of China's FDI on improving the productivity, infrastructure, and trade of host BRI countries. The outcome of their study showed that China's FDI enhances the productivity, infrastructure, and trade of host BRI countries. Yang et al., (2018) analyzed the thought of both the innovative Silk Road economic belt and maritime Silk Road, united as BRI. They suggested that these roads are multilateral trade and welfare relationships between China and link road countries. Rai, Brown, & Ruwanpura, (2019) analyzed the honest job and financial enlargement. They explained that gender and labor rights highlight SDG 8 as it sustained decent work and economic growth (Amin et al. 2021), (Li et al. 2020).

Gong (2019) explained the Belt and Road Initiative (BRI) speculation in digital connectivity and information technology on attaining sustainable development goals. They suggested that the ICT sector in China is concerned with producing investment in both public and private sectors in China and a significant interest of the BRI-related countries. Dong et al., (2018) explained the role of the BRI and its purpose to facilitate to achieve 2030 program for sustainable development through the linkage of global environmental governance (Abbas et al. 2020b). They identified the connection between the Belt and Road and 2030 agenda for sustainable development goals (SDGs) could explain global environmental governance deficits and its need to facilitate cooperation among the countries (Sun et al. 2020a), (Iqbal et al. 2020a).

Horn & Grugel, (2018) demonstrated the SDGs in middle-income states. They considered that these countries are responding to the SDGs outlined in plan 2030. They suggested that SDGs cannot be sufficient conditions for development that nations will adopt but also others factors

like political structures are significant factors for growth (Abbas et al. 2020a).
Mukwaya & Mold, (2018) analyzed the impact of the China Belt and the Road initiative on the trade performance of East Africa. They suggested that BRI has a significant effect on the trade performance of East Africa. Selmier, (2018) illustrated the BRI, its progress, and achievements. He suggested that BRI has a significant impact on running sustainable development goals. Frey (2017) described that SDG 8 promotes economic growth, decent work, and full employment. He found that a complete job is prominent in SDG and also for the 2030 plan (Anser et al. 2020a). He suggested that SDG 8 promotes accountability and monitoring for business and trade and also for the business. Gu, Awokuse, & Yuan, (2008) investigated the contribution of FDI in the export performance of china. They suggested that a significant and positive impact of foreign investment on the export of China. Wang et al. (2007) explained the contribution of FDI in the export performance of china. They identified a positive and significant effect of foreign investment on the export of China. Hong, (2017) investigated the critical role of the "Belt and Road Initiative" towards the sustainable expansion goals. He identified that those areas under the Belt and Road could achieve the contribution of sustainable expansion objective.

3. Source of Data and Estimation

The main objective of our study is the impact of foreign investment on the trade performance of BRI countries. The trade performance is calculated through the exports of supplies as well as services. The foreign direct investment (FDI) measures foreign investment, the carbon dioxide emissions per unit of manufacturing value-added measure environmental safety. The other variables, such as gross fixed capital formation and growth rate, are SDGs, exchange rate, and population, are used as control variables. The data is collected from World Development Indicator (WDI). For our analysis, we used six selected Belt and Road Initiative (BRI) countries: China, India, Malaysia, Pakistan, Russia, and Turkey.

3.1 Econometric Estimation

To get reliable and significant results, different econometrics techniques are used for estimation.

3.1.1 Unit Root Analyses

Different panel unit root tests check the model of the variables for BRI countries to detect integration on both variables. The test of Levin, Lin, & Chu, (2002) is begun by way of the ADF equation,

$$\Delta y_{it} = \alpha_0 y_{it-1} + \sum_{p=1}^{ni} \alpha_{1ip} \Delta y_{it-p} + \lambda_{it} + \varepsilon_{it}$$

$\alpha_0 = n-1$, that engage the ordinary procedure of panel unit root survival through the payment of conflicting lag order of integration in cross-sections of the panel. The null hypothesis (H_0) indicates the non-stationarity, whereas the Alternate Hypothesis (H_1) indicates stationary series.
(Im, Pesaran, & Shin, 2003) expressed a panel unit identifies the ADF of each class of panel assigned to a particular panel by measuring the average t-statistics of ADF statistics $\bar{t}_{NT}$. With

a zero interval in the above equation of the ADF, it has been pointed out that IPS (2003) indicates the key values stated in each class (n) and the length of the series and for the variables that are implanted by constant or also by constant with trend each other. For non-zero intervals, IPS (2003) indicates that the normal distribution $\bar{t}_{NT}$ is given below in the equation.

$$X_{\bar{t}_{NT}} = \frac{\sqrt{P}\left[\bar{t}_{NT} - N^{-1}\sum_{i=1}^{N} F(\bar{t}_{it}(N_i)) \right]}{N^{-1}\sum_{i=1}^{N} Var(\bar{t}_{it}(N_i))}$$

Where $F(\bar{t}_{it}(N_i))$ is mean and/is the variances of the ADF regression of t-statistic caused by IPS (2003), with reverence of various lags, series lengths, and assumptions supporting different test equations.

3.2 Panel Econometrics Estimation techniques

3.2.1. Fixed Effect Model

In the panel regression analysis, the Fixed Effect Model indicates the unit's only specific effect associated with the explanatory variables. The F.E model explains that quantities that are non-random and also sample groups of the mean are considered as a sample of the population in the model. In this model, data is generated into a group that is regarded as various observed indicators. In panel data, the F.E model identifies the subject-specific means. The equation of the Fixed Effect model is given below,

$$Y_{it} = \alpha_{yxt} X_{it} + \alpha_{yzt} Z_i + \delta_{\varpi} \eta_t + \varepsilon_{it}$$

3.2.2. Random Effect Model

In the panel regression analysis, the random effect model indicates the only specific effect of the unit that is not associated with the explanatory variables. In a random effect model, a small sample size is considered. The R.E model explains that arbitrary quantities and sample groups of the mean are considered a sample of the population in the model. The data can be arranged in the random effect model as several experimental factors, showing object-specific means.

$$Y_{it} = \alpha_{yxt} X_{it} + \alpha_{yzt} Z_i + \delta_{\varpi} \eta_t + \varepsilon_{it}$$

3.2.3. Generalized Method of Moments (GMM)

In econometrics, it is a general technique used for estimating the parameters in the statistical models that explain the model parameters. The expectation of these parameters is zero because of their valid values. The panel OLS shows that the number of the moment restrictions is equal to the number of unknown parameters, like ∑[Xe]=0. The 2SLS that indicates the length of endogenous variables are the same as the instruments; an example of the identified GMM estimator is ∑[Ze]=0, and thus also called MM.

The first differenced GMM is applied when the period is small (Blundell and Bond, 1998). The main advantage of the GMM estimator is that it does not need any external instrument to tackle the problem of endogeneity. The GMM has applied two hypotheses; the first is that the

error term is not related to the instrumental variables. Secondly, there is no autocorrelation (AR2) is verified to first-order autocorrelation (AR1) that is checked by (Arellano-Bond tests).

$$\ln y_{i,t} - \ln y_{i,t-1} = \beta_0 + \lambda(\ln y_{i,t} - \ln y_{i,t-2}) + \beta'(\ln X_{i,t} - \ln X_{i,t-1}) + (\delta_t - \delta_{t-1}) + (\mu_{i,t} - \mu_{i,t-1})$$

3.3 Model Specification

This study examines the effect of infrastructure investment on the trade performance of BRI countries. As discussed in the previous section, many factors may affect exports. We make the model by subsequent models (Gu et al., 2008) and (Ismail & Mahyideen, 2015). Our model for this study is given below

$$Y_{i,t} = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \mu_t$$

Where the subscripts i and t denote the cross-sectional unit and time series, respectively. μ is a disturbance term. α are parameters. Our estimated model is,

$$EXPORT_{i,t} = \beta_0 + \beta_1 GDP_1 + \beta_2 GFCF_2 + \beta_3 FDI_3 + \beta_4 ER_4 + \beta_5 CO2MVA_5 + \beta_5 POP_5 + \varepsilon_t$$

Table 1: Description and Measurement of Variables

Variables	Description	Measurement	Hypothetical Relationship
Exports of goods and services	(EXPORT)	Export of goods and services as a % of GDP.	
Carbon dioxide emissions	(CO2MVA)	Carbon dioxide emissions per unit of manufacturing value added	Positive
Fixed Capital Formation	(GFCF)	Fixed Capital Formation as a % of GDP.	Positive
Gross Domestic Product	(GDP)	Gross Domestic Product Growth rate	Positive
Population	(POP)	Population Growth rate as an input	Positive
Exchange Rate	(ER)	Exchange Rate	Positive
Foreign Direct Investment	(FDI)	Foreign Direct Investment inflow %	Positive

Source: Author's explanation based on Literature Review

The primary purpose of our study is the impact of foreign investment on the trade performance of BRI countries. The table shows the descriptive statistical analysis of the variables which are chosen for the model.

4. Results and Discussion

Table 2: Statistics Summary of the Variables

	EXPORT	CO2MVA	GFCF	FDI	ER	POP	GDP
Mean	47.82	0.90	29.51	2068.75	0.19	0.32	0.30

Median	19.33	0.77	29.48	1838.01	0.16	0.36	0.34
Maximum	24.62	1.76	45.51	5682.92	0.32	0.51	0.41
Minimum	17.04	0.29	12.52	263.14	0.12	0.21	0.09
Std. Dev.	73.37	0.52	8.96	1374.03	0.06	0.12	0.10
Skewness	1.84	0.16	-0.12	0.84	1.11	0.93	-0.92
Kurtosis	4.84	1.26	2.75	2.87	2.94	2.80	2.60
Jarque Bera	42.52	7.79	0.29	7.13	12.42	9.34	8.99
Probability	5.82	0.02	0.86	0.02	0.00	0.00	0.01

Source: Author's calculation based on Stata

Table 2 shows descriptive statistics of the variables. The mean value of CO2MVA is 0.90, with a standard deviation is 0.52 that indicates lower dispersion. The mean change of Export of BRI countries is 47.82 with a standard deviation is 73.37that indicates wider dispersal. The mean value of GFCF is 29.51 using its standard deviation is 8.69. The FDI has a mean worth of 2068.75 with a standard deviation is 1374.03 that indicates wider dispersion. The mean values of ER, POP, and GDP are 0.19, 0.32, 0.30, correspondingly to display lower spreading as standard deviation are varied from mean cost.

Skewness has three cases, 1) positively skewed, 2) negatively skewed, and 3) symmetrically skewed (Blumer 1979). The table indicates that all variables show positively skewed except GFCF, that the model shows satisfactory Skewness statistics. By the kurtosis, we check the central peak of the variables, and into the above, the board kurtosis proves broader peak and thicker end i.e. Leptokurtic. Consequently, it is established that a great deal of the standards are intense about the mean.

Table 3: The Results of Correlation Matrix

	EXPORT	**CO2MVA**	**GFCF**	**FDI**	**POP**	**GDP**	**ER**
EXPORT	1						
CO2MVA	0.24	1					
GFCF	0.766	0.12	1				
FDI	0.10	0.019	0.21	1			
POP	0.87	0.03	0.86	0.05	1		
GDP	0.54	0.29	0.52	0.46	0.48	1	
ER	0.31	0.23	0.43	0.38	0.53	0.56	1

Source: Author's calculation based on Stata

The correlation in the middle of the variables is exposed above the table. Correlation stands for the power of the connection amid the variables. It demonstrates no multicollinearity within the model. The variables explain weak as well as a strong association between every other.

Before relating the different econometric estimation methods like panel OLS, Random effect, and GMM techniques, they were first checked by the stationarity of the variables by various panel unit root tests. The panel unit root tests of IPS (2003) and Levin, Lin, and Chu (2002) are used to ensure the stationarity of the variables. The consequences demonstrate that variables are stationarity at level apart from FDI to include order 1. The results show in the

table which is given below,

Table 4: The Results of unit root analysis

Unit Root Test (Based on Levin, Lin, and Chu (LLC,(2002))					
Variables	**Level**		**1st Difference**		**Conclusion**
	Constant	**Constant with Trend**	**Constant**	**Constant with Trend**	
EXPORT	-1.32*	-1.29*	-	-	I(0)
CO2MVA	-1.46**	1.71**	-	-	I(0)
GFCF	-3.02*	-2.86*	-	-	I(0)
FDI	3.64***	4.68***	-0.61**	-0.18**	I(1)
POP	-1.54**	-2.10**	-	-	I(0)
ER	-0.13**	-0.71**	-	-	I(0)
GDP	-1.71**	-1.94**	-	-	I(0)

Unit Root Test (Based on IPS (2003))					
Variables	**Level**		**1st Difference**		**Conclusion**
	Constant	**Constant with Trend**	**Constant**	**Constant with Trend**	
EXPORT	-1.74*	-1.57*	-	-	I(0)
CO2MVA	-0.86**	-1.16**	-	-	I(0)
GFCF	-2.43*	-1.93*	-	-	I(0)
FDI	4.11***	4.08***	-2.32**	-3.11**	I(1)
POP	-0.89*	-1.05*	-	-	I(0)
ER	-3.54**	-3.87*	-	-	I(0)
GDP	-1.03*	-0.93*	-	-	I(0)

Note: *, **, & *** show significant at 1, 5, & 10 percent, respectively.

Source: Author's calculation based on Stata

To determine the impact of foreign investment on the trade performance of BRI countries. The trade performance is deliberate by the exports of goods and services. Following different estimation techniques of Panel OLS, Random Effect & GMM on the data in support of our analysis such as (Merale Fatahi-Vehapi et al, 2015). In Table 5 below, there are 4 columns; the first column shows variables Name. The second column is panel OLS technique results. The third column represents the Random effect results, and the last column represents the GMM technique results. The computed wald statistics F value is 27.11 that is confirmed the long-run cointegration. The results of these techniques are given below in Table 5.

Table 5: The Results of Regression analysis Based on Panel OLS, Random Effect, and GMM

Dependent variable: Export of Goods and Services			
Variables	**Panel OLS**	**Random Effect**	**System GMM**
CO2MVA	0.05*** (0.30)	0.04*** (0.19)	0.08*** (0.12)

GFCF	0.23* (0.00)	0.16* (0.00)	0.49* (0.01)
FDI	0.21* (0.00)	0.34* (0.03)	0.17* (0.04)
POP	0.19** (0.00)	0.16* (0.05)	0.15* (0.02)
ER	0.46* (0.00)	0.47*** (0.23)	0.63** (0.05)
GDP	0.56* (0.00)	0.61* (0.03)	0.63** (0.05)
R^2	0.85	0.61	0.67
Adjusted R^2	0.81	0.57	0.65
D.W	2.44	2.02	1.70
J statistics	-	-	3.79*
Wald Test F statistics	27.11* (0.000)		

Note: *, **, & *** show significant at 1, 5, & 10 percent, respectively.
Source: Author's calculation based on Stata

The primary intention of this study is to find the impact of foreign direct investment on the trade performance of BRI countries. The results showed that foreign direct investment has a significant effect on the trade performance of BRI countries. Exporting value-added goods and services with CO2MVA has an impact and positive relationship (Iqbal et al. 2020b), (Iram et al. 2020).

China has the most significant CO_2 emission and exports in the region that's why an increase in CO2 emission effects increases environmental pollution in the country (Qayyum et al. 2019), (Sahban and Abbas 2018). GFCF has a significant and positive impact on exports of goods and services (Rajni, 2013). The consequences explain that capital arrangement has a significant effect on the trade performance of the BRI countries (Anser et al. 2020b). When capital formations accumulate, then there will be more investment which creates more production (Hanif et al. 2019). Capital formation boosts trade performance, and hence it makes significant impacts to increase exports of the BRI countries (Hanson & Robertson, 2008). GDP, POP, and ER have significant and positive impact on exports of goods and services (Bensassi, Márquez-Ramos, Martínez-Zarzoso, & Suárez-Burguet, 2015)

5. Conclusion

The main objective of our study is the impact of foreign investment on the trade performance of BRI countries and identifies the linkage with SDGs 2030. The study's empirical results

demonstrate a positive and significant effect of foreign direct investment on trade in all countries. One of the BRI countries, China, is expanding its massive investment under BRI. It has a significant role in promoting BRI and achieving SDGs with the help of infrastructure development and industrial growth. The study suggested that for better performance and achieving the Agenda 2030, BRI countries should focus on green environmental policy and reduce carbon dioxide emission by improving the industrial structure and cooperation. These countries also focus on infrastructure investment to increase the industrial value-added that boosted the trade performance, growth, gross capital formation. So, this study helps the policymakers to make future policies for the betterment of trade performance and achieving SDGs in these countries.

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