

Article

Global Structural Shocks and FDI Dynamic Impact on Productive Capacities: An Application of CS-ARDL Estimation

Mirzat Ullah ^{1,*}, Hafiz M. Sohail ², Hossam Haddad ³, Nidal Mahmoud Al-Ramahi ³ and Mohammed Arshad Khan ⁴

¹ Graduate School of Economics and Management, Ural Federal University, Yekaterinburg 620002, Russia

² School of Economics and Management, South China Normal University, Guangzhou 510631, China

³ Business Faculty, Accounting Department, Zarqa University, Zarqa 11831, Jordan

⁴ Department of Accountancy, College of Administrative and Financial Sciences, Saudi Electronic University, Riyadh 11673, Saudi Arabia

* Correspondence: mirzat.ullakh@urfu.ru

Abstract: The COVID-19 pandemic has inflicted structural shocks on the global economic system by raising high economic uncertainty. Policymakers are exploring alternative measures and incentivizing foreign direct investment for the restoration of global economic operations to achieve short- and long-term growth. Given this, the study examines the global response of FDI inflow to measure the change in productive capacity. The productive capacity is proxied by structural change, private business sector, institutional quality, transportation infrastructure development, and natural capital. The study implements empirical analysis for a large panel of 170 countries in a data set from 2000 to 2021. Furthermore, the study employed the cross-sectional augmented auto-regressive distributed lag (CS-ARDL) econometric estimation method for better examinations of current changes in an economic outbreak. From the results of the study, the estimations reveal that FDI inward has significant positive impact over the private business sector, institutional quality, transportation infrastructure, and natural capital on inward FDI. In accordance with discussions, the study suggests several pragmatic policy implications to achieve maximum output by utilizing the inward FDI as incentivized by the governments of the selected countries.



check for updates

Citation: Ullah, M.; Sohail, H.M.; Haddad, H.; Al-Ramahi, N.M.; Khan, M.A. Global Structural Shocks and FDI Dynamic Impact on Productive Capacities: An Application of CS-ARDL Estimation. *Sustainability* **2023**, *15*, 283. <https://doi.org/10.3390/su15010283>

Academic Editor: Antonio Boggia

Received: 1 November 2022

Revised: 28 November 2022

Accepted: 5 December 2022

Published: 24 December 2022



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords: FDI; productive capacity; CS-ARDL estimations; COVID-19

1. Introduction

Foreign direct investment (FDI) has been referred to as a potential engine for economic growth and expansion in domestic trade. FDI flows are the main driver of modern globalization and a source of international capital circulation. We considered FDI as a base for economic development and a source of national growth as FDI assists in improving the environmental and social circumstances of the hosting country, where FDI encourages overall growth through increasing total factor productivity and enhances the economy's resources. With such multi-dynamic advantages, with FDI inflow, every country wants to invite more FDI. The competition for inviting FDI has intensified an uncertain economic environment, particularly after COVID-19, where the importance of FDI inflow has changed. In this research, we study the relationship between FDI inflow and the productive capacity of the hosting country. In the productive capacity, we include the institutional quality, transportation infrastructure quality, private business sector capacity, social structure, and natural capital of 170 from twenty years of historical data by using [1] by employing the CS-ARDL estimation to examine the real-time impact of the global response of FDI inflow and change in productive capacity.

In this modern era of strategic alignment, developed economies invest their FDI to secure domestic countries' political benefits [2] Foreign investors are observed to be more interested in investing in private business sector institutions by focusing on the quality of

institutions, especially the policies regarding FDI in domestic countries. For this, developing countries are increasingly adopting lenient policies by providing substantial provisions in taxation and other incentives to attract FDI. More FDI can be attracted through the implementation of technology, good management practices, and a skilled labor force. FDI is concerned with light government regulation and the appreciation in taxation as it frequently goes beyond capital investment. Studies have extensively investigated the role across various sectors concerning different contributions. For example, according to [1], the global FDI flow has increased by 3%, whereas the flow to advanced countries increased by 3%.

Furthermore, studies reported a massive increase in demand for FDI that offer favorable conditions after the pandemic of COVID-19 as this ongoing pandemic crisis intensified the world economy more than any other crisis. In such economic outbreaks, international trade needs serious attention to form new policies that invite more foreign investors.

Apart from several benefits of FDI, inflow is a driver of productivity. FDI is supposed to transfer a new roadmap of products and processes with the potential to enhance domestic production capability [3]. This study provides a statistical answer to the question of whether FDI enhances productivity in developing countries. Several empirical studies have been conducted in this context. Some studies contradict this [4] and others support it [5]. For this study, we illustrate previous studies. In this, one-third of the studies confirm a positive and significant effect of FDI on productive capacity and some reported a significantly negative effect. The majority of the studies present developing countries. Thus, the reason is clear that the link between FDI and productive capacity has yet to be investigated for a sufficiently large group of countries, irrespective of the size of the economy, to produce such claims. This current study resolves this issue and explains the real-time impact of FDI and productive capacity. Structural economic shocks such as natural disasters, financial crises, and war threats disrupt the global and regional economic flow. At the same time, COVID-19 caused a massive dropdown in FDI flow and the economic system faced more challenges during this period. Figure 1 explains the FDI inflow worldwide.

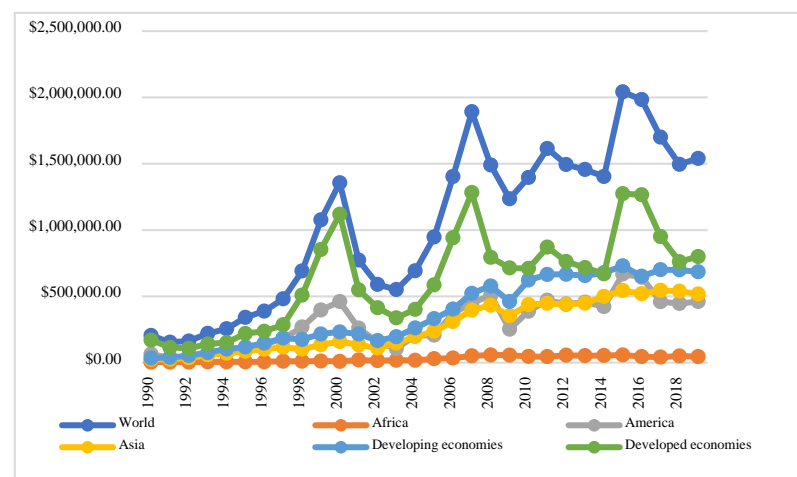


Figure 1. Foreign direct investment: inward flows (1990/2019) in USD. Source: author's calculation.

The motivation of this research is anchored on the policies needed to provide an extensive analysis of the capabilities of FDI inflow and increase the productivity of the hosting country. For a better examination of the above objective, we are examining several other variables that can affect the overall productivity at the domestic level, including institutional quality, transportation infrastructure quality, private business sector capacity, social structure, and natural capital of the hosting country. Although the pandemic has subsided, the aftershock still lingers and the global economy is still vulnerable. This consequential effect of structural shocks may create wealth inequality, unsustainable debt, and rampant environmental destruction. The pandemic further indicates the need for economic buffers and viable recovery plans from structural shocks. Several challenges

remain unaddressed following the pandemic and further pose a significant challenge to the global economic recovery.

Furthermore, this study adds several novelties to the existing literature: First, we study the relationship between productive capacities, which includes the institutional quality, transportation infrastructure quality, private business sector capacity, social structure, and natural capital of the hosting country by examining a large-scale panel dataset of 170 countries' irrespective of the size and capitalization; the time period of the historical data is from 2000 to 2021. Second, we study the asymmetric relationship between productive capacities and FDI by using the [1] database. Previous studies used a single or regional economy's historical datasets to examine the relationship between FDI and productive capacity with few control variables [6–8]. However, this research uses the full index to examine the real determinants of productive capacities and FDI inflows. Third, in terms of econometric estimation, we used multiple modern estimation tools to analyze the effect of FDI inflow and global structural shocks on productive capacity, keeping the changes economies faced after the COVID-19 pandemic in view.

Further used is the CS-ARDL estimation with the additional implication of fixed effects and random effects to examine the real-time impact of the global response of FDI inflow to changes in productive capacities such as structural change, the private sector, institutional quality, transportation infrastructure, and natural capital. The study applies the several pre-estimation techniques to remove the issues related to data distribution, such as heteroskedasticity, auto-correlation, and cross-sectional independence. The results of this study provide important mixed results. FDI inflow significantly affects productive capacity. We found the dynamic associations in a productive capacity where institutional quality, transportation infrastructure quality, private business sector capacity, social structure, and natural capital of the hosting country are significantly and positively an attraction for FDI.

The remaining sections of the paper are presented with a summary of the previous relevant literature in the segment. Section 3 explains the applied methodology, while Section 4 explains how the empirical results were obtained. Section 5 contains the conclusion of this paper.

2. Literature Review

The systematic links between FDI inflow and its impact on productive capacity, institutional quality, transportation infrastructure quality, private business sector capacity, social structure, and natural capital has uncovered. There has been abundant empirical evidence showing a significant relationship among the above variables, but the studies conducted for developing countries where FDI inflow from developed countries are examined. In this section, we are emphasizing a broad set of important macroeconomic variables and their linkage with productivity growth one by one for a better understanding.

2.1. Foreign Direct Investment and Institutional Quality

The institutional quality is a broad set of quality indicators tested empirically with many dimensions. The relationship between FDI and institutional quality has been studied. For instance, ref. [9] studied the effect of FDI inflow and institutional corruption for 45 host countries and found a significant negative relationship. Corruption is the element that discourages foreign investment. In opposition to this, ref. [10] highlighted the significant and positive associations between FDI inflow volatility and good management practices in the panel data analysis of more than 163 countries from 1996 to 2006. Ref. [11] studied the institutional and cultural differences between developed and developing countries regarding FDI flow. They used the fisher approach for the panel of 52 emerging economies. Recent studies show a significant positive impact of FDI inflow in economies with the rule of law, regulatory quality, and control over corruption; the political stability and government effectiveness are positively correlated. Ref. [12] measures the composite impact of institutional quality over FDI inflow. An institution's quality determines the collective effects in combining multiple effects to utilize the FDI better.

On the other hand, the flow of FDI may decrease with an unfavorable economic situation. The regulations and policies regarding foreign investment, government instability, the unpredictability of laws, excessive regulatory burden, and lack of commitment are all these factors that significantly affect the FDI inflow [13]. However, most of the studies examined emerging and advanced economies separately. Consequently, there are very limited insights regarding this relationship. We are examining the relationship between FDI inflow, institutional quality, and its impact on productivity for the first time for large numbers and mixed orders of emerging and advanced economies.

2.2. Foreign Direct Investment and Structural Change

Structural change is the transformation of production from labor-intensive to knowledge-intensive in a drive of economic growth. Such transformation has the potential to fulfill the demand for productive capacity. Ref. [14] conclude that structural change is adopting an end-user services strategy by the manufacturing sector. Ref. [15] focused on mass production with incremental labor professionalization. The adoption of structural change is important for the expansion of economic growth. The structural change characterized by growth in production and a mix of quantitative and qualitative changes approach develops concentrative spatial reality where new tertiary expansion and globalization processes influence structural change. According to [16], foreign investors consider such an economy with quantifiable productive capability, the potential for the emergence of goods and services and human resources training opportunities. FDI inflow changes the processes by value addition for targeted sectors, which is a significant structural change element.

Structural change and FDI determine the role of economic development of the economy of the hosting country. The macro-structural approach specifies the effects of the process on employment, production levels, and wage rate. Ref. [17] revealed that inward FDI allows for comparisons from a microstructural perspective. This approach is complemented and explains the relationship between economic development and FDI. The structural change in the service sector created more opportunities [18]. The operations of multinational firms in a regional market drive the economy to create new businesses. Ref. [19] contradicts and shares the Mexican experience where FDI inflow builds barriers for local industries that affect the integrating process. Ref. [20] developed a case study highlighting an imbalance between the quality of the jobs they provide and the advancing trajectories of export manufacturing plans. Furthermore, the innovation and technification of the labor force are negatively related to the social progress of the plant's worker force (Figure 2).

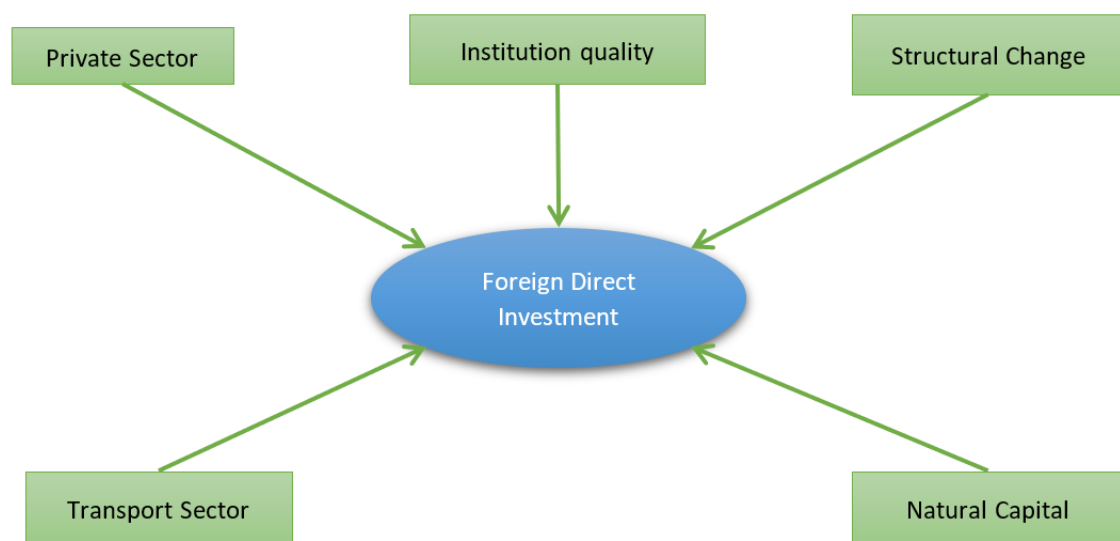


Figure 2. Conceptual framework of the study. Source: author's calculation.

2.3. Foreign Direct Investment and Private Sector

The private business sector creates more opportunities for businesses and jobs, provides mobility to financial resources, and facilitates investments that are key to economic growth. Private sector providers often have higher returns to labor, self-recruitment autonomy, market-applied earning conditions, and comparative pay-out ratio. At the same time, the sector is also facing various limitations such as [21] found that government legalizations and rules are the main factors to slow down the growth of the private sector. In opposition to this, ref. [22] revealed that those changes in public laws help protect labor rights. However, these limitations contribute to better efficiency than the public sector [23]. They concluded that the private sector has several advantages, such as financial and administrative autonomy and power of decision-making in response to the market situation.

Many studies examined the relationship between FDI and the private business sector. At an aggregate level, an increase in FDI inflow creates more opportunities and stimulates economic and industrial growth [24]. The general assertion in the economic literature supports that FDI is the prime mode for industrial development and stimulates developing economies. The [1] has specified the FDI in several types and the private sector is considered an investment involving FDI in the extractive sector. The private sector might lead the economy by providing more employment and trade [23]. Economists agree that the private sector is more wealth-creating than the services industry or commodities sector. Therefore, it is argued that manufacturing-related FDI is larger than extractive-sector FDI [25].

2.4. Foreign Direct Investment and Transport Quality

A resilient transportation system has the potential to increase accessibility to create more productive opportunities with low costs. For better transportation, the role of infrastructure must be maintained. Both are aligned with each other. Several studies examined the role of transport infrastructure [26]. Most of the studies revealed that transport infrastructure has a significant positive impact on increasing the economy's productive capacity. The adequate supply of transportation infrastructure is mostly available at low costs, which assures a favorable impact on the firm's effectiveness in increasing productivity and earnings. The FDI inflow has seemed more productive for developing economies with better transport infrastructure. Foreign investors consider the transport infrastructure as the key factor in increasing productivity [27].

Ref. [28] examined the determinants of FDI and found that better transport infrastructure helps the economies to invite more FDI. Ref. [29] study that transport infrastructure and FDI inflow have an optimistic impact on the productive level of Malaysia. Ref. [30] reconsidered the impact of infrastructure and economic environment on FDI inflow for a mix of 81 developed and developing economies; they found that countries with low transport infrastructure failed to fulfill the market demand and provide growth to national income. Haque, ref. [31] examined the threshold effect of the transport infrastructure over FDI inflow and realized that transport infrastructure has a positive role in the attractiveness of receiving FDI.

2.5. Foreign Direct Investment and Natural Resources

Natural resources are considered an alternative to FDI inflow. Economies with rich natural resources need more skilled full labor and reliable institutional quality to receive the maximum benefits by utilizing the natural resources. We found empirical studies with different observations; some studies consider FDI as opposing natural resources with a view of the exploitation of natural resources in creating economic growth developed by foreign investors [32]. On the other hand, natural resources can be best utilized with good management practices and sufficient financial resources, which is possible with FDI inflow as discussed [33]. Some studies also documented a negative relationship between economic growth and the abundance of natural resources. Using cross-country regression, ref. [34] documented an adverse association between FDI inflow and natural resources. They found

a robust difference in measuring resource abundances, such as the mining production share in total GDP, the share of natural resource exports in GDP, and the land per capita. Ref. [35] found that increasing natural resource exports in total GDP is creating a lower economic growth rate. The purported stability of this conclusion has been thoroughly examined. It is challenging for emerging countries where the private sector receives more foreign investment and consumes a higher portion of the national natural resources of the economy. Examining the role of natural resources in economic development needs serious attention from public institutions, such as proper taxation and caring the environmental outcomes.

After the pandemic outbreak, the economies faced slow growth in productive capacity and the usage of natural resources was almost at the lowest level of utilization. However, the usage of natural resources is currently at a high utilization level due to increased demand. In response to these changing dynamics of FDI inflow and the utilization of natural resources, examining healthy and effective institutional structures, fiscal policy, environmental regulation, and judgment at the political level may help to put FDI inflow in a position to progressively impact natural resources. Natural resource extraction consumes physical capital and needs an investment portfolio, possibly due to enabling FDI inflow [36]. Ref. [37] state that natural resources can decrease returns to scale.

In contrast, the other sectors, such as manufacturing, are decreasing outputs at the firm level and, with an externality, lead to an increase in overall output. We insinuate that developing economies with effective labor forces are shielded from decreasing natural resources with the productive utilization of all factors. Several empirical studies demonstrate that an interaction effect between abundant natural resources and human capital contributes to economic growth [38].

3. Methodology and Data

3.1. Model and Data Specification

The study examines the real-time impact of FDI inflow on productive capacity in the era of the pandemic crisis. The productive capacity is proxied with a mix of indicators such as structural shocks, institutional quality, private business sector, transportation infrastructure, and natural resources. Interestingly, the estimation model of the study overviews the impact of FDI inflow and global structural shocks on productive capacity with the implication of renewed organized dataset derived from [1] and a World Bank for a large set of 170 countries irrespective of economy size. The initial econometric model that examines the influence of all demographic factors on productive capacity is delineated in the following econometrics equations.

$$\text{Ln FDI} = \beta_0 + \beta_1 \text{LnSTRU}_t + \beta_2 \text{PRIVS}_t + \beta_3 \text{INSTS}_t + \beta_4 \text{TRANS}_t + \beta_5 \text{NATUC}_t + \varepsilon_{it} \quad (1)$$

The study employed a natural logarithm for an empirical econometric estimation to cause the coefficients to be interpretable in approximate proportional differences. We also consider the beta risk factor associated with investments and residual error term ε_{it} . The variables and data sources are mentioned in Table 1.

Table 1. Abbreviation used for variables in the study. Source: author's calculation.

Variable	Code	Unit	Data-Source
Foreign Direct Investment	FDI	Percentage	World Bank
Structural Change	STRC	100	UNCTAD-2021
Private Business Sector	PRIVS	100	UNCTAD-2021
Institutional Quality	INSTS	100	UNCTAD-2021
Transportation Infrastructure Sector	TRANS	100	UNCTAD-2021
Natural Capital	NATUC	100	UNCTAD-2021

3.2. Empirical Estimation Procedure

3.2.1. Pre-Estimation Analysis Technique

To choose a suitable estimation method for the econometric model, we execute several necessary pre-estimation tests to perform the estimation and analysis more consistent and ensure reliability with authentic results for policy implications. We implement estimation tests such as Augmented Dickey–Fuller (ADF) and unit root tests to check the data for stationarity issues.

3.2.2. Cross-Section Dependency Estimation (CD)

The CD test developed by [39] helps us select a proper estimation model and allow us to remove the cross-sectional dependency, possible heterogeneity issue, and comparison of null hypothesis among all variables. The test is based on the following assumptions:

$$CDS = \sqrt{\frac{2f}{N(N-1)} \sum_{i=1}^{N-1} \sum_{j=i+1}^N \frac{(f-d)\hat{r}_{ij}^2 - E[(f-d)\hat{r}_{ij}^2]}{\text{var}[(f-d)\hat{r}_{ij}^2]}} \quad (2)$$

where \hat{r}_{ij}^2 denotes the correlation of residual OLS estimation of each parameter, ref. [40] suggested using short-time range panel data; the cross-sectional dependency test can measure the cross-sectional dimensions.

3.2.3. Panel Unit Root Estimation Test

We assumed no unit root and uncorrelated cross-sectional in the dataset. Ref. [41] proposed second-generation panel unit root tests of CIPS for a balanced panel data set non-stationary to resolve such limitations. The suggested CIPS statistic is as follows:

$$CIP(\cdot, t) = \frac{1}{n} \sum_{i=1}^n t_i(n, t) \quad (3)$$

where $t_i(n, t)$ indicates the t statistic of θ_i .

3.2.4. Cross-Sectional Autoregressive Distributed Lag Estimation (CS-ARDL)

This study employs the CS-ARDL estimations based on pre-estimation tests to examine the cointegration among the variables used in the study. CS-ARDL estimation has numerous advantages compared to other ordinary estimations. In particular, it addresses the error correction issue by considering a one-year lag for predicated variables within the framework. This renewed estimation allows us to control unobservable issues and measure the short- and long-term effects. We employed PMG estimation-based CS-ARDL estimation upholding the idea that assessments are asymptotically unbiased with “ $n \rightarrow \infty$ ” for both fixed “ t ” and “ $N \rightarrow$ ”. Additionally, the study demonstrates the common correlation bias due to issues such as observed and unobserved errors in forecasting the short-run and long-run dynamics. The estimated model for panel data set analysis using CS-ARDL is as under:

$$\Delta FDI_{it} = \mu_i + \varnothing_i (FDI_{it-1} - \beta_i x_{it-1} - \vartheta_{1i} \overline{FDI}_{t-1} - \vartheta_{2i} \overline{x}_{t-1}) + \sum_{j=1}^{r-1} \pi_{ij} \Delta \ln FDI_{it-j} + \sum_{j=0}^{s-1} \omega_{ij} \Delta x_{it-j} + r_{1i} \Delta \ln \overline{FDI}_t + r_{2i} \Delta \overline{x}_t + \varepsilon_{it} \quad (4)$$

Here, the dependent variable is represented \overline{FDI}_{t-1} in a given long-time period with a one-year lag term, where x_{it} and \overline{x}_{t-1} show the regressed vectors for transportation infrastructure, structural change, natural capital, private business sector, and institutional quality for the long term with a one-year lag term. Similarly, cross-sectional elements are denoted by $j = 1 \dots j$ and the time duration is shown by $t = 1 \dots t$; π_{ij} and ω_{ij} denote short-term coefficients r_{1i} and r_{2i} represent $\overline{\mu}$ the mean.

4. Empirical Results and Discussion

Table 2 shows summary statistics where the mean and standard deviation of FDI are 4.071 and 7.023, respectively, indicating that FDI has been highly moveable throughout the study period. The mean and standard deviation for structural change is 1.471 and 1.015, indicating a lower level of variability across the sample. The institutional quality value summary is 2.802, with an average logarithmic showing significant variation across the sample. Natural capital has a mean value of 2.842 and a standard deviation of 1.055, indicating more diversity in HC across the countries. Finally, the mean value of transportation infrastructure is 1.231, with a standard deviation of 1.313, indicating more significant variability over the study period. The summary statistics show minor standard deviations, indicating normal distribution among the time-series variables.

Table 2. Descriptive statistics. Source: author's self-calculations.

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
LogFDI	3230	4.071	7.023	43.583	131.017
LogSTRUC	3230	1.471	1.015	2.452	2.974
LogPRIVS	3230	4.333	0.246	2.526	3.462
LogINSTS	3230	3.913	1.487	2.312	4.602
LogTRANS	3230	1.231	1.313	2.398	3.313
LogNATUC	3230	2.842	0.055	1.571	3.460

Table 3 shows the correlation matrix where FDI positively correlates with structural change, natural capital, the private business sector, transportation infrastructure, and institutional quality. We found a negative relationship between structural change and natural capital. Similarly, the same relation between natural capital and transportation infrastructure can be seen. However, no correlation is found above the tolerance level.

Table 3. Correlation's matrix. Source: author's self-calculations.

Variables	LogFDI	LogSTRUC	LogPRIVS	LogINSTS	LogTRANS	LogNATUC
LogFDI	1.000					
LogSTRUC	0.135	1.000				
LogPRIVS	0.224	0.525	1.000			
LogINSTS	0.129	0.630	0.685	1.000		
LogTRANS	0.132	0.489	0.525	0.588	1.000	
LogNATUC	0.036	−0.343	−0.275	−0.323	−0.401	1.000

Table 4 exhibits CS-ARDL estimation for cross-sectional dependency issues in models 1, 2, and 3. In model 1, the estimation resolves the cross-sectional dependency issue by considering short-run wavelength, whereas model 2 addresses the same issue in the long run. However, model 3 reports the cross-sectional dependency issue for both short run and long run with a common correlation influence by examining each indicator throughout the concerned sample over the study time period for mixed order 170 different size economies. The coefficient for the error-correction term is found to be significant and negative for all variables, which indicates the long-run relationship between the variables shown in model 3. Our study signifies that the FDI inflow has impacted the overall productive capacity after the COVID-19 economic outbreak. The value of the negative coefficient shows the magnitude of the speed of adjustment from short-term disturbance to long-term. This study's adjustment speed to the equilibrium point in the long-run relationship is 24 percent. According to the main central hypothesis, inward FDI is promoted by structural change. The coefficient of structural change is highly significant both in the short and long run. It indicates the assumption of structural change induced to attract more FDI inward.

Table 4. CS-ARDL Estimation.

Variables	CD-SR (Model 1)	CD-LR (Model 2)	CD-SR and LR (Model 3)
Long Run Results			
lnFDI _{it}	0.536 ** (0.167)	0.469 ** (0.170)	0.826 ** (0.071)
lnSTRC _{i,t}	0.341 ** (0.160)	0.736 * (0.163)	0.629 ** (0.156)
<i>I</i>	0.581 * (0.340)	0.254 * (0.133)	0.165 ** (0.060)
lnINSTI _{i,t}	0.604 (0.880)	0.477 (0.578)	0.217 (0.348)
lnTRAIS _{i,t}	0.105 (0.141)	0.126 (0.178)	0.079 (0.089)
lnNAIUC _{i,t}	0.976 ** (0.168)	0.653 * (0.164)	0.592 ** (0.015)
Short Run Results			
lnFDI _{it}	1.983 *** (0.466)	1.143 *** (0.278)	1.074 *** (0.208)
lnITRC _{i,t}	2.971 *** (0.259)	1.943 ** (0.153)	1.514 *** (0.039)
lnIRIVS _{i,t}	0.380 *** (0.018)	0.216 ** (0.016)	0.170 *** (0.019)
IIINSTS _{i,t}	1.947 *** (0.861)	1.268 *** (0.126)	0.953 *** (0.065)
lnTRANS _{i,t}	1.634 *** (0.006)	1.009 *** (0.000)	0.986 ** (0.000)
<i>I</i>	1.862 *** (0.526)	1.569 *** (0.238)	1.097 *** (0.176)
Cons.	1.983 *** (0.466)	1.143 *** (0.278)	1.074 *** (0.208)
ECT(−1)	−0.593 *** (0.095)	−0.416 *** (0.033)	−0.347 *** (0.041)
Obs.	3230	3230	3230
N	170	170	170

***, **, and * denotes significance level at 1%, 5%, and 10%, respectively.

This study suggests that improving the overall productive capacity in the context of the private business sector, institutional quality, transportation infrastructure sector, and natural capital boosts the total factor productivity in both the short- and long-run terms in the sampled economies across the study period. The results are aligned with the idea that a resilient transportation infrastructure allows businesses to switch from tangible unproductive assets to productive assets, increasing the product supply. As a result, the economy's productive capacity rises with the increase in real GDP. Our results suggest that the effect of foreign direct investment on the productive capacity is significantly positive. Foreign direct investment theoretically boosts the host country's total factor productivity through the following several mechanisms: First, businesses in the private sector in the host country will gain more demand from domestic and international markets due to FDI inward, lowering the cost due to mass production and increasing the probability of producing more reliable products. Second, the FDI inward spillover effect of such high investment will enhance productivity in the home country, enhancing its ability to produce more sophisticated goods [42]. Third, industries in the host nation can lower their production costs through FDI inward easy credit and reduce the price of more sophisticated products while freeing up more resources for R&D, thus boosting productivity. The positive relationship between FDI and productive capacity is supported by earlier studies, including [43,44].

Our findings contradict [45]. The link between the private business sector and the FDI influx is considerable and favorable for the economy's overall productivity. The findings show that increases in the private business sector by 1 percent increase FDI inflow by 42.2 percent. The findings are consistent with the previous study [46]. Similarly, ref. [47] looked at the impact of FDI drivers in the Asian region. According to the institutional quality coefficient, a 1 percent increase in institutional quality strengths boosts the FDI inflow by 31.04 percent. Likewise, results have been reported by [44,48] between 1996 and 2016. They looked at the relationship between institutional quality and FDI in four types: low-, lower-, upper-, and high-income nations. Institutional quality has a favorable impact on economies irrespective of the economy size, where the quality of governance is better. Similarly, ref. [49] found that institutional quality in the host nation relates to a large inflow of FDI. Several other studies recently explored that institutional quality positively and significantly impacts FDI with diverse location choices [50].

The transportation sector's impact is favorable to attract more FDI to host countries where it enhances the moment of business goods because of domestic and international operations. Here, in this study, during the indicated COVID-19 period, we see a 1 percent improvement in transport efficacy can enhance FDI inflow by 23.76 percent. These outcomes are the same as those examined by [51] for emerging economies. They had a beneficial impact on FDI inflow and the chance to draw FDI. Where the natural capital of the sample has a productive correlation with FDI inflow, implying that a rise of 1 percent in natural capital will rise FDI inflow by 27.9 percent. Similarly, the findings of [47] reveal that natural resources considerably impact FDI inflow.

Robustness Check

The findings indicate that FDI promotes productive capacity. In addition, other variables such as social structure, the private sector, institutional quality, transportation, and natural capital significantly and positively affect FDI inflow. These findings align with the CS-ARDL approach, though there is a deviation in coefficient values from this robustness check method. More importantly, the signs and significance levels obtained from this robustness check procedure are similar to the findings from the CS-ARDL method.

5. Conclusion and Policy Recommendations

Foreign direct investment (FDI) is considered the soul of an economy and works as an engine in moving economic progress upward. The FDI has the potential to provide circulation to nations' wealth, improve skills and creativity, and, more importantly, creates more employment due to creating business opportunity in the host country. Therefore, policymakers have emphasized inviting more FDI in different countries. However, during the wave of the COVID-19 pandemic, the economies faced a significant financial outbreak. One of the most contentious issues in this regard is how to quickly generate considerable economic growth in advanced and emerging economies. Therefore, as a solution to this economic shutdown, the economies have taken various measures to attract more foreign investments to overthrow the ongoing deficit.

Regarding the importance of FDI, we develop a quantitative framework to evaluate the impact of productive capacities on FDI inflow. First, we consider productive capacity a mixed index of several crucial variables, such as natural capital, institutional quality strength, transportation infrastructure, and the private business sector. Another important factor of this study is considering a large sample of 170 countries irrespective of economy size. The mixed-income classified economy is selected because COVID-19 affects underdeveloped, developed, and emerging countries worldwide. Finally, we examined a large historical panel data sample from 2000 to 2021 extracted from [1]. We employed various advanced estimation approaches to explore the real-time impact of productive capacity on FDI inflow.

We execute several per-estimation tests, such as CIPS and unit root tests and Westerlund cointegration tests, to select the CS-ARDL approach for cointegration. Overall, we

find several unique findings. The findings demonstrate that FDI inflow has a significant impact on production capacity. Notably, the private business sector and institutional quality attract more foreign investment because the private business sector is more profitable than the public sector. Institutional quality is a common factor in ensuring business operation quality and protecting all stakeholders' interests. Similarly, the transportation infrastructure sector is significant and positively associated with FDI inflow. Foreign investors are more interested in where the business operation requires a minimum lead time from production to selling. Moreover, the study finds structural change and natural capital less contributive.

From the second part of our results, we find that all variables complement FDI favorably except the private business sector. Every single variable is completed and has an essential role in improving the economy's growth. Additionally, the structural change and natural capital are non-linear to FDI inflow. Finally, this research study's results help significantly re-establish economic vigor after the COVID-19 financial setback.

We suggest several policy implications to the concerned authorities based on our results. First, governments must promote the private business sector and authorize them in business decision-making to invite more foreign investments. Second, the administrations need to maintain the resilient transportation infrastructure sector, strengthen institutional quality in controlling corruption, and conduct a fair audit to protect the rights of citizens. Finally, the current research should include other variables such as environmentally sustainable factors, renewable energy generation factors, and trade openness concerning economy size differentiation.

Author Contributions: All authors (M.U., H.M.S., H.H., N.M.A.-R., M.A.K.) of this article contributed equally to each section of the entire article. All authors have read and agreed to the published version of the manuscript.

Funding: The APC was funded by Zarqa University, Zarqa, Jordan.

Institutional Review Board Statement: We confirm that we have compiled this article with ethical standards.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data is available publicly, we explained its data source in Table 1.

Acknowledgments: We acknowledge the originality of this research work. We agree to give the right to the journal to publish our research study.

Conflicts of Interest: The author declares that there is no conflict of interest at all.

References

1. UNCTAD. Trade and Development Report 2021. 2021. Available online: https://unctad.org/system/files/official-document/tdr2021overview_en.pdf (accessed on 1 June 2021).
2. Sohail, H.M.; Zatullah, M.; Li, Z. Effect of foreign direct investment on bilateral trade: Experience from Asian emerging economies. *SAGE Open* **2021**, *11*, 21582440211054487. [CrossRef]
3. Wooster, R.B.; Diebel, D.S. Productivity spillovers from foreign direct investment in developing countries: A meta-regression analysis. *Rev. Dev. Econ.* **2010**, *14*, 640–655. [CrossRef]
4. Gunby, P.; Jin, Y.; Reed, W.R. Did FDI really cause Chinese economic growth? A meta-analysis. *World Dev.* **2017**, *90*, 242–255. [CrossRef]
5. Preis, T.; Moat, H.S.; Stanley, H.E. Quantifying trading behavior in financial markets using Google Trends. *Sci. Rep.* **2013**, *3*, 1684. [CrossRef] [PubMed]
6. Getzner, M.; Moroz, S. Regional development and foreign direct investment in transition countries: A case study for regions in Ukraine. *Post-Communist Econ.* **2020**, *32*, 813–832. [CrossRef]
7. Saini, N.; Singhania, M. Determinants of FDI in developed and developing countries: A quantitative analysis using GMM. *J. Econ. Stud.* **2018**, *45*, 348–382. [CrossRef]
8. Vanlaer, W.; Picarelli, M.; Marneffe, W. Debt and Private Investment: Does the EU Suffer from a Debt Overhang? *Open Econ. Rev.* **2021**, *32*, 789–820. [CrossRef]
9. Wei, S.-J. How taxing is corruption on international investors? *Rev. Econ. Stat.* **2000**, *82*, 1–11. [CrossRef]
10. Čermáková, K.; Procházka, P.; Kureková, L.; Rotschedl, J. Do Institutions Influence Economic Growth? *Prague Econ. Pap.* **2020**, *2020*, 672–687. [CrossRef]

11. Khan, S.; Ullah, M.; Shahzad, M.R.; Khan, U.A.; Khan, U.; Eldin, S.M.; Alotaibi, A.M. Spillover Connectedness among Global Uncertainties and Sectorial Indices of Pakistan: Evidence from Quantile Connectedness Approach. *Sustainability* **2022**, *14*, 15908. [[CrossRef](#)]
12. Gani, A. Governance and foreign direct investment links: Evidence from panel data estimations. *Appl. Econ. Lett.* **2007**, *14*, 753–756. [[CrossRef](#)]
13. Daude, C.; Stein, E. The quality of institutions and foreign direct investment. *Econ. Politics* **2007**, *19*, 317–344. [[CrossRef](#)]
14. Cui, L.; Weng, S.; Nadeem, A.M.; Rafique, M.Z.; Shahzad, U. Exploring the role of renewable energy, urbanization and structural change for environmental sustainability: Comparative analysis for practical implications. *Renew. Energy* **2022**, *184*, 215–224. [[CrossRef](#)]
15. Murshed, M.; Elhaddad, M.; Ahmed, R.; Bassim, M.; Than, E.T. Foreign direct investments, renewable electricity output, and ecological footprints: Do financial globalization facilitate renewable energy transition and environmental welfare in Bangladesh? *Asia Pac. Financ. Mark.* **2022**, *29*, 33–78. [[CrossRef](#)]
16. Dang, Q.T.; Jasovska, P.; Rammal, H.G. International business-government relations: The risk management strategies of MNEs in emerging economies. *J. World Bus.* **2020**, *55*, 101042. [[CrossRef](#)]
17. Pineli, A.; Narula, R.; Belderbos, R. *FDI, Multinationals and Structural Change in Developing Countries*; Working Paper 4; UNU-MERIT: Maastricht, The Netherlands, 2019.
18. Barua, S.; Naym, J. Economic Climate, Infrastructure and FDI: Global Evidence with New Dimensions. *Int. J. Bus. Econ.* **2017**, *16*, 31.
19. Dussel Peters, E. Características de las actividades generadoras de empleo en la economía mexicana (1988–2000). *Investig. Econ.* **2003**, *63*, 123–154.
20. Bensusán, G.; Carrillo, J.; Micheli, J.; Carrillo, J.; Bensusán, G.; Micheli, J. ¿Está Realmente la Innovación Asociada con la Mejora Social? ¿Qué Podemos Aprender de los Estudios de Caso? In *Es Posible Innovar y Mejorar Laboralmente*; Carrillo, J., Bensusán, G., Micheli, J., Eds.; Metropolitan Autonomous University: Mexico City, Mexico, 2017; pp. 627–690.
21. Mahbub, T.; Ahammad, M.F.; Tarba, S.Y.; Mallick, S.M.Y. Factors encouraging foreign direct investment (FDI) in the wind and solar energy sector in an emerging country. *Energy Strategy Rev.* **2022**, *41*, 100865. [[CrossRef](#)]
22. Fahad, S.; Bai, D.; Liu, L.; Baloch, Z.A. Heterogeneous impacts of environmental regulation on foreign direct investment: Do environmental regulation affect FDI decisions? *Environ. Sci. Pollut. Res.* **2022**, *29*, 5092–5104. [[CrossRef](#)]
23. Azman-Saini, W.N.W.; Law, S.H. FDI and economic growth: New evidence on the role of financial markets. *Econ. Lett.* **2010**, *107*, 211–213. [[CrossRef](#)]
24. Latif, Y.; Ge, S.; Qamri, G.M.; Ali, S. The Determinants of Trade Openness in Two Emerging Economies; China-Pakistan Economic Corridor Perspective. *IEEE Trans. Eng. Manag.* **2022**, *3*, 1–9. [[CrossRef](#)]
25. Akinlo, A.E. Foreign direct investment and growth in Nigeria: An empirical investigation. *J. Policy Model.* **2004**, *26*, 627–639. [[CrossRef](#)]
26. Kocsis, B.; Vida, G.; Szalay, Z.; Ágoston, G. Novel approaches to evaluate the ability of vehicles for secured transportation. *Period. Polytech. Transp. Eng.* **2019**, *49*, 80–88. [[CrossRef](#)]
27. Shahbaz, M.; Mateev, M.; Abosedra, S.; Nasir, M.A.; Jiao, Z. Determinants of FDI in France: Role of transport infrastructure, education, financial development and energy consumption. *Int. J. Financ. Econ.* **2021**, *26*, 1351–1374. [[CrossRef](#)]
28. Hoang, H.H.; Huynh, C.M.; Duong, N.M.H.; Chau, N.H. Determinants of foreign direct investment in Southern Central Coast of Vietnam: A spatial econometric analysis. *Econ. Chang. Restruct.* **2022**, *55*, 285–310. [[CrossRef](#)]
29. Ahmad, N.A.; Ismail, N.W.; Nordin, N. The impact of infrastructure on foreign direct investment in Malaysia. *Int. J. Manag. Excell.* **2015**, *5*, 584–590. [[CrossRef](#)]
30. Buera, F.J.; Kaboski, J.P. Can traditional theories of structural change fit the data? *J. Eur. Econ. Assoc.* **2009**, *7*, 469–477. [[CrossRef](#)]
31. Haque, M.M.; Chowdhury, M.A.F.; Shakil, M.H.; Masih, M. Infrastructure-FDI nexus in Nigeria: Insights from non-linear threshold regression model. *Afro Asian J. Financ. Account.* **2021**, *11*, 20–34. [[CrossRef](#)]
32. Iqbal, S.; Wang, Y.; Shaikh, P.A.; Maqbool, A.; Hayat, K. Exploring the asymmetric effects of renewable energy production, natural resources, and economic progress on CO₂ emissions: Fresh evidence from Pakistan. *Environ. Sci. Pollut. Res.* **2022**, *29*, 7067–7078. [[CrossRef](#)]
33. Ekananda, M. Role of macroeconomic determinants on the natural resource commodity prices: Indonesia futures volatility. *Resour. Policy* **2022**, *78*, 102815. [[CrossRef](#)]
34. Sachs, J.D.; Warner, A. *Economic Convergence and Economic Policies*; National Bureau of Economic Research: Cambridge, MA, USA, 1995.
35. Botta, A.; Yajima, G.T.; Porcile, G. *Structural Change, Productive Development, and Capital Flows: Does Financial “Bonanza” Cause Premature Deindustrialization?* Working Papers Series; Levy Economics Institute: Annandale-On-Hudson, NY, USA, 2022.
36. Ali, M.; Kirikkaleli, D.; Sharma, R.; Altuntaş, M. The nexus between remittances, natural resources, technological innovation, economic growth, and environmental sustainability in Pakistan. *Environ. Sci. Pollut. Res.* **2022**, *29*, 75822–75840. [[CrossRef](#)] [[PubMed](#)]
37. Lederman, D.; Maloney, W. *Open Questions About the Link between Natural Resources and Economic Growth: Sachs and Warner Revisited*; Banco Central de Chile: Santiago, Chile, 2002; Volume 141.

38. Xie, Z.-J. The Non-Linear Effect of Institutional Distance on the Location Selection of China's Outward Foreign Direct Investment. In Proceedings of the 5th Annual International Conference on Management, Economics and Social Development (ICMESD 2019), Suzhou, China, 21–22 June 2019.
39. Baltagi, B.H.; Hashem Pesaran, M. *Heterogeneity and Cross-Section Dependence in Panel Data Models: Theory and Applications Introduction*; Wiley Online Library: Hoboken, NJ, USA, 2007; Volume 22, pp. 229–232.
40. Le, H.P.; Sarkodie, S.A. Dynamic linkage between renewable and conventional energy use, environmental quality and economic growth: Evidence from Emerging Market and Developing Economies. *Energy Rep.* **2020**, *6*, 965–973. [CrossRef]
41. Chudik, A.; Pesaran, M.H. Large Panel Data Models with Cross-Sectional Dependence: A Survey. 2013. Available online: <https://www.google.com.hk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwigh7KAKOn7AhW8sVYBHSw4BAIQFnoECBAQAQ&url=https%3A%2F%2Fwww.econ.cam.ac.uk%2Fpeople-files%2Femeritus%2Fmhp1%2Fwp13%2FChudik-Pesaran-Surevy-CSD-13-August-2013.pdf&usg=AOvVaw1otdd5r8XNsnW4jdp7a1BQ> (accessed on 30 October 2022).
42. Sohag, K.; Ullah, M. Response of BTC Market to Social Media Sentiment: Application of Cross-Quantilogram with Bootstrap. In *Digitalization and the Future of Financial Services*; Contributions to Finance and Accounting; Vukovic, D.B., Maiti, M., Grigorieva, E.M., Eds.; Springer: Cham, Switzerland, 2022.
43. Herzer, D.; Nunnenkamp, P. FDI and Income Inequality: Evidence from Europe (No. 1675). Kiel Working Paper. 2011. Available online: <https://www.google.com.hk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiCpqG6j-n7AhXFpVYBHTdcATUQFnoECAwQAQ&url=https%3A%2F%2Fwww.econstor.eu%2Fbitstream%2F10419%2F45887%2F1%2F643791663.pdf&usg=AOvVaw2IerB2qB5libbx5RXuwu6B> (accessed on 30 October 2022).
44. Sohail, H.M.; Ullah, M.; Sohag, K.; Rehman, F.U. Considering the Impact of Sustainable Development Goals on Economic Boost-trip; A Case from Pakistan's Economy; Environmental Science and Pollution Research. 2022. Available online: <https://www.google.com.hk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjy5cr6jun7AhWkpVYBHQV3CIQQFnoECAoQAQ&url=https%3A%2F%2Fwww.researchsquare.com%2Farticle%2Frs-1704495%2Fv1.pdf&usg=AOvVaw07hcTJowmc0r3GZTQ5EoyM> (accessed on 30 October 2022).
45. Kottaridi, C.; Louloudi, K.; Karkalakos, S. Human capital, skills and competencies: Varying effects on inward FDI in the EU context. *Int. Bus. Rev.* **2019**, *28*, 375–390. [CrossRef]
46. Seyoum, B.; Manyak, T.G. The impact of public and private sector transparency on foreign direct investment in developing countries. *Crit. Perspect. Int. Bus.* **2009**, *5*, 187–206. [CrossRef]
47. Hasli, A.; Ho, C.S.F.; Ibrahim, N.A. Determinants of FDI inflow in Asia. *J. Emerg. Econ. Islam. Res.* **2015**, *3*, 9–17. [CrossRef]
48. Sabir, S.; Rafique, A.; Abbas, K. Institutions and FDI: Evidence from developed and developing countries. *Financ. Innov.* **2019**, *5*, 1–20. [CrossRef]
49. Bissoon, O. Can better institutions attract more foreign direct investment (FDI)? Evidence from developing countries. *Int. Res. J. Financ. Econ.* **2012**, *82*, 142–158.
50. Mat, S.H.C.; Harun, M. The impact of infrastructure on foreign direct investment: The case of Malaysia. *Procedia Soc. Behav. Sci.* **2012**, *65*, 205–211.
51. Saikia, M. Foreign direct investment and institutions: A case of Indian firms. *J. Int. Trade Econ. Dev.* **2021**, *30*, 725–738. [CrossRef]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.