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The Impact of Special Economic Zones (SEZs) on Economic Growth: Where the Absorption Capacity of Domestic Labor Stands?

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Abstract
This study designs to assess and infer the effect of Special Economic Zones under China-Pakistan Economic Corridor on the economic growth of Pakistan through technological spillovers and the absorption capacity of domestic laborers. The present study develops a theoretical model and an empirical panel model to test whether the intervention of Special Economic Zones in the Asian developing countries has affected their economic growth through domestic Human Capital. For relevant results, we have employed the GMM model for the panel data set. The results indicate that the technological enhancement accumulates the economy through various other selected indicators rather than domestic labor productivity. The human capital remains inconsequent in this nexus. This condition gives us guidelines to follow pro-human capital policies to accumulate domestic human capital before the intervention from the foreign firms on our soil. Subsequently, much waited for dynamic or long-run benefits in terms of human capital can be attained rather than static effects.

Keywords:
total factor productivity, human capital, technological transfer, CPEC, special economic zones

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Introduction

A generally acceptable instrument among the researchers to upsurge and boost the growth of an economy to successfully attain the status of a "developed country" is to provoke the nation to transform into an export-oriented economy. This condition becomes possible only after taking critical initiatives regarding uplift in the overall sectors of the economy. One suggestive approach is to encourage the development of infrastructure and related projects. Along with a secure and stable business environment to gain the interest and confidence of especially those foreign business communities who may possess exceptional business ideas and prodigious investment and are actively engaged in discovering the nations crammed with utmost human capital, effortlessly accessible at economical rates.

This ideology attracts foreign investment after focusing intensively on the establishment of technology-based industries, necessary to produce products adequate to meet the international standards and, hence, improve the nation's exports. It is considered a significant device to gain a satisfactory degree of physical and capital productivity. For this purpose, the provided literature documents that the nations in the 21st century have adopted specific policies to expand their exports. Among these strategies, a considerable policy has been developing "industrial clusters" through structural changes after keeping appropriate locations into account. This concept was first established in Southeast Asia in 1704; however, the first globally acknowledged industrial zone was constructed in Ireland in 1959. Since then, various economic zone setups holding different policies have evolved that are subsumed under Special Economic Zones (SEZs). These include Free Trade Zones, Export Processing Zones (EPZs), Enterprise Zones (EZs), Free Ports (FPs), single factory EPZ, and specialized zones.

The phenomenon of SEZ has not been cryptic for Pakistan as the manufacturing sector that was considered a non-functional sector stimulated in the 1970s after establishing various industrial zones throughout the nation. The majority of the industrial zones collapsed because of political instability, weak governance framework, rent-seeking behavior. This condition deteriorated the share of the manufacturing sector at an aggregate (Zia et al., 2018).

Once well known for its unparalleled potentials, a country is considered unfeasible as far as the business environment is concerned. In such situations, China believes Pakistan to play a viable role in a megaproject "Belt and Road Initiative (BRI)" through the "China-Pakistan Economic Corridor" (CPEC). CPEC is based on a 1+4 portfolio that comprises the construction of Gwadar port, up-gradation of the energy sector, and significant improvements in Pakistan's infrastructure. Instead of making all this functional, the development of SEZs has been the sole constituent in CPEC projects. Therefore, in a modified context, developments of EPZs/SEZs have been the point of interest. In this manner, CPEC SEZs are focused on the uplift of Pakistan through sustainable economic growth, keeping intact essential indicators. All of this is to facilitate foreign firms to operate in Pakistan. In this regard, Pakistan has already signed MoUs with the Chinese government to establish nine SEZs under CPEC.

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As discussed earlier, SEZs are introduced in an economy to upsurge the FDI, exports, and employment rate of the domestic workforce. However, the received literature opposes the expected outcomes mainly in the ASEAN countries, where SEZs were meant to prosper economies through static and dynamic outcomes (Zia et al., 2018). We have observed static outcomes in most countries, but the presence of dynamic effects was a question mark. The factors responsible for the prevailing situation included poor location choice, lack of infrastructure, administrative procedure, and lower labor productivity (Amirahmadi & Wu, 1995).

In Pakistan, the intervention of Chinese enterprises is anticipated to provide countless opportunities to the economy. In this association, we are focused on empirically assessing how the economy of Pakistan can benefit from Chinese intervention in the light of its intervention in the Asian developing countries. Therefore, in particular, this study aims to empirically assess the static and dynamic effects of SEZs in the economic growth process. Keeping in view the existing dilemma in most Asian countries, we shall analyze a crucial component of the long-term dynamic outcome of the technological-based projects, such as the effect of technological shift through SEZs on the up-gradation of the human capital of domestic laborers after analyzing its effect on the economic growth.

International trade plays a significant role in unfolding technology across the world. The developing countries heavily rely on import liberalization, demanded by the domestic firms to increase productivity through foreign innovated technology. Adopting imported technology has a positive and robust impact on domestic production. In consequence, economic growth is furtherly skewed within the host country. Likewise, Coe & Helpman (1995) indicate that international trade is a significant factor in international knowledge spillover to developed and developing countries (Coe et al., 1997). Zeren & Ari (2013) do research a bi-directional causal relationship between trade liberalization and economic growth in G7 countries. Mercan et al. (2013) also study a relationship between trade openness and economic growth in a panel of BRICS countries. Dritsakis & Stamatiou (2016) examined a uni-directional causal relationship in a panel of the European Union.

The study's objective is to analyze the impact of technological spillover on manufacturing sector productivity, namely TFP. Along with our variable of interest (technological spillover), we have several control variables common to each regression.

Methods

An empirical model is formulated to identify the effect of SEZs on the economy through the channel of the human capital of domestic labor. Coe & Helpman (1995) and Coe et al. (2008) suggested that the new growth theories have been under consideration to build the model. They are beginning from the endogenous growth framework on technological spill over through trade. The studies above have analyzed the effect of trade liberalization on the domestic technological stock. The Total Factor Productivity has identified the change in the technological stock. Assuming the Hicks-neutral production function:

$$Y_t = A_t K_t^a L_t^{(1-a)} \quad (1)$$

Where, Y_t is the total output, K_t represents the capital stock and the L_t represents labor. However, the total factor productivity "A_t" captures the effectiveness of capital and labor or any other input that does not categorize under the typical boundaries of capital and labor. After taking logs on both sides, the model will take the following shape

$$lnY_t = lnA_t + alnK_t + (1-a)lnL_t \quad (2)$$

In this model, the Total Factor Productivity (TFP) will capture the effect of technological spillover. After incorporating the Schumpeterian growth framework, the model shall take the form in which the contribution of conventional factors, capital, and labor will be subtracted from the total output to measure the TFP. Moreover, the domestic and foreign R&D investment will be added to the model to capture the technological improvements. In the following, we shall illustrate the proposed model.

$$lnA_{it} = lnY_{it} - alnK_{it} - (1-a)lnL_{it} + lnRD_{it}^d + lnRD_{it}^f + lnX_{it} \quad (3)$$

Where: A represents TFP, Y represents the total output, K represents the capital employed in the production process, and RD is the expenditure executed for domestic and foreign Research and Development in a given economy.

Dependent Variable

Total Factor Productivity explains the share of output that is not explained under the traditionally measured inputs of labor and capital utilized in the production process. For instance, the level of efficiency and intensity of the inputs involved in the production process. TFP is highly correlated with the output. Therefore, to capture the implicit mechanism in the output, it provides valuable insights. The process of measuring TFP has been discussed earlier under eq. 2, after keeping A_t, i.e., TFP on the left-hand side of the equation. The data set for TFP is collected from the Penn World Table 9.0 data set.

Independent Variable

Certain variables are used as proxies to transform a theoretical model into an empirical model and estimate the desired hypothesis. Acknowledging this fact, we shall use the proxies of all the available data to capture the picture of the analysis. For instance, to capture technological spillover, we have identified three variables, Foreign Direct Investment, Trade Openness, and Imported Technology.

Foreign Direct Investment is an indicator to depict a firm's investment or individual to gain business interest in another country. Generally, this type of investment is made in a relatively deprived country to concentrate on value addition through sophisticated technologies. Therefore, it is considered as a gateway towards introducing new technologies. The data of FDI utilized in this paper has been collected from World Development Indicator (WDI).

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Trade Openness is the ratio of trade volume to real GDP, which illustrates trade liberalization. Trade liberalization indicates the volume of tradable commodities transferred between countries. This phenomenon does not only have inherent benefits in terms of trade and integration. Rather other benefits such as knowledge transfer are also considered as a significant element. For instance, a commodity transferred through trade conveys the knowledge of packing similar kinds of commodities in the importing countries. However, if sophisticated technologies transfer, the existing obsolete knowledge drastically accumulates in the importing country. Therefore, the variable Trade Openness has been utilized as a proxy of the technological spillover. It will be interesting to see its impact on the prevailing human resources. The data has been collected from WDI.

Technological Transfer is another indicator to capture the technological spillover. It is calculated by the imports of machinery and transport equipment as a percentage of total imports. This variable indicates the intensity of technology transfer in the economy. Studies suggest that high technological Transfer is explored, particularly in those economies where such firms are operating which tend to produce products on international standards. In effect, sophisticated technologies are used, which is possible only after the intervention of foreign firms in the case of developing countries, especially in the SEZs of developing countries. In this regard, SEZs are captured by the mentioned variables like Foreign Direct Investment, Trade Openness, and Technological Transfer. The data has been collected from UN Comrade Statistics.

Human Capital has been utilized to capture the impact of absorption capacity of domestic workers in accumulating the economy through technology. It is an index of human capital per person, constructed by the average years of schooling and the return to education. This indicator portrays the level of knowledge available in an economy. There is a threshold exceeding from which the individuals can absorb the foreign technologies and operate accordingly.

Table 1 *Correlation* matrix of the selected variables

	TFP	TO	FDI	TECH	GSIZE	RDEV	INDUST	FD	HC	INSQUA
TFP	1.00									
TO	0.1368	1.00								
FDI	0.1968	**0.8551**	1.00							
TECH	0.1346	**0.6928**	**0.6546**	1.00						
GSIZE	-0.0517	0.1776	0.1026	0.3153	1.00					
RDEV	-0.0630	0.5133	0.4636	**0.7822**	0.2822	1.00				
INDUST	0.1287	-0.6410	-0.4747	-0.5722	-0.3174	-0.4586	1.00			
FD	0.1386	0.1658	0.1764	0.3039	0.1385	0.1986	-0.2953	1.00		
HC	-0.0847	0.4990	0.4036	**0.6152**	0.3161	0.5466	**-0.8393**	0.2976	1.00	
INSQUA	-0.0976	**0.7923**	**0.6267**	**0.7371**	0.4601	**0.7029**	**-0.7098**	0.1660	0.6664	1.00

As we can see from Table 1 that some of the variables are correlated. Trade Openness and FDI are positively correlated. We can also analyze the same for Trade Openness, technology, and institution quality. Table 1 shows the correlation between these variables to see whether the data is reliable to regress. Technology, on the other hand, is positively correlated with Research and Development and Institution Quality. However, in all of the above cases, we can conclude that none of the variables are highly correlated, and therefore, multicollinearity also does not exist. Secondly, we have estimated the results using STATA. This software tends to omit the regressors due to which multicollinearity exists.

Three proxies, such as Foreign Direct Investment, Trade Openness, and Technological Transfer, will be utilized for SEZs or technological spillover, while Human Capital will be used for the absorption capacity of domestic labor along with other five indicators. First, Financial Sector Development such as the Composite index of Money supply (M3), Bank credit to the private sector, and Stock market capitalization. Second, Research and Development Expenditure, i.e., R&D investment as a percent of GDP. Third, Government Expenditure, i.e., General government final consumption expenditure (% of GDP). Fourth, Industrial Structure such as the Share of the Industrial Sector to GDP and finally Institutional Quality, i.e., Composite index of control of corruption, political stability and absence of violence/Terrorism, Regulatory Quality, the rule of law, Voice and accountability.

To transform the Cobb Douglas model into an empirical model and utilize the data above to extract the hypothesis. The following empirical models are regressed. All of which will include in every model and other interaction terms like Trade Openness with Human Capital, FDI with Human Capital, and Technological Transfer with Human Capital.

Model 1

In the first model we shall analyze the effect of Human Capital with the Foreign Direct Investment. In effect, the model will take the following form:

$$TFP_{it} = a + B_1 FD_{it} + B_2 RD_{it} + B_3 GSIZE_{it} + B_4 IQ_{it} + B_5 INDUST_{it} + B_6 HC_{it} + B_7 FDI_{it} + u_{it} \quad (4)$$

Where, the *FD* (Financial Development), *RD* (Research & Development), *GSIZE* (Government Expenditure), *IQ* (Industrial Quality) and *INDUST* (Industrial Development) are the controlled variables while *HC* (Human Capital) will be analyzed with the FDI. Likewise, 3 models are regressed for every proxy of technological spill over separately with the Human Capital.

Model 2

$$TFP_{it} = a + B_1 FD_{it} + B_2 RD_{it} + B_3 GSIZE_{it} + B_4 IQ_{it} + B_5 INDUST_{it} + B_6 HC_{it} + B_7 TO_{it} + u_{it} \quad (5)$$

Where, TO_{it} is the Trade Openness for selected Asian countries.

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Model 3

$$TFP_{it} = a + B_1FD_{it} + B_2RD_{it} + B_3GSIZE_{it} + B_4IQ_{it} + B_5INDUST_{it} + B_6HC_{it} + B_7TECH_{it} + u_{it} \quad (6)$$

Where, $TECH_{it}$, is the technological transfer.

Model 4

In this model the interaction term is included with other control variables. The model takes the following form:

$$TFP_{it} = a + B_1FD_{it} + B_2RD_{it} + B_3GSIZE_{it} + B_4IQ_{it} + B_5INDUST_{it} + B_6FDI_{it} * HC_{it} + u_{it} \quad (7)$$

Here in this model, $FDI_{it} * HC_{it}$ has been included which shows the indirect relation of technology with the economic growth. Interaction terms with other proxies have been regressed in separate models. Therefore, two more models are regressed by constructing the interaction term of HC with TO (Trade Openness) and TECH (Technological Transfer).

Model 5

$$TFP_{it} = a + B_1FD_{it} + B_2RD_{it} + B_3GSIZE_{it} + B_4IQ_{it} + B_5INDUST_{it} + B_6TO_{it} * HC_{it} + u_{it} \quad (8)$$

Model 6

$$TFP_{it} = a + B_1FD_{it} + B_2RD_{it} + B_3GSIZE_{it} + B_4IQ_{it} + B_5INDUST_{it} + B_6TECH_{it} * HC_{it} + u_{it} \quad (9)$$

The data employed in this paper is panel and secondary in nature, as the effect of technological improvements shall be analyzed in the Asian countries where the Special Economic Zones are already operational. Therefore, the relevant data for the selected Asian countries where we found interventions of foreign firms in Special Economic Zones such as Bangladesh, Bhutan, India, Indonesia, Nepal, Malaysia, Maldives, Singapore, Sri Lanka, Philippines, Thailand and Pakistan were under consideration. The data for the Total Factor Productivity and Human Capital has been utilized from Penn World Table 9.0 after incorporating own calculations, while the data of Industrial Structure, Government Expenditure, Institutional Quality and Trade Openness has been collected from the World Bank. Whereas, the data for Technological Transfer has been collected from UN COMTRADE Statistics, and finally, the principal component index constructed the data of Financial Sector Development.

Result and Discussion

As our data set comprises both selected South and East Asian countries, our empirical model is estimated with pooled OLS as the results of pooled OLS are considered inefficient in panel data. We have moved on to apply the Breusch-Pagan test to examine that either intercept values remain the same for all cross-sections or not. This test provides direction to either run the analysis keeping Fixed Effects or Random Effects, which directed us to go for the Random Effects. The result of the Breusch-Pagan test shows in Table 2.

Table 2. Bruesch-Pagan Test Results

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Chai^2	24.35	20.50	14.30	22.95	20.48	24.73
Probability	0.000	0.000	0.0000	0.0000	0.0000	0.0000

Then, we applied the Hausman test to justify whether the fixed effect results are more consistent than the random effect. For all specifications, the null hypothesis of the Hausman test has not been accepted, indicating a fixed effect. The result of the Hausman test shows in Table 3.

Table 3. Hausman Test Results

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Chai^2 Values	256.98	449.92	345.56	453.89	356.98	478.98
P-Values	0.008	0.000	0.000	0.001	0.000	0.000

Next, we applied the Redundant Fixed Effects test to choose between cross-sections, time effects, and cross-sections and time effects as the null hypothesis was rejected for all specifications that clearly show the existence of fixed effects. Table 4 shows the result of the redundant fixed effect test.

Table 4. Redundant Cross-Sectional Fixed Effects Test

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
F-Values	48.4574	36.062	48.354	47.785	47.456	35.254
P-Values	0.000	0.000	0.000	0.000	0.000	0.000

After the results, we have applied the LM test to examine the existence of serial correlation. The null hypothesis of "no serial correlation" was accepted in all specifications. Table 5 shows the result of the LM test. On these bases, we used GMM by Arellano and Bond (1991) to estimate the dynamic panel data model.

Table 5. Serial Correlation (LM) Test

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
F	47.282	63.527	98.524	46.036	64.154	103.837
P-values	0.0001	0.0000	0.0000	0.0001	0.0000	0.0000

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Table 6 presents the estimated results of the Total Factor Productivity (TFP) model. In model 1, we acquired the technological spillover through trade openness (TO)it and its impact on manufacturing sector productivity, however, the role of absorptive capacity is captured through interaction term of trade openness, and human capital $(TO * HC)_{it}$, which shows that $(TO)_{it}$ has a positive impact on TFP_{it} in selected countries. The coefficient of $(TO)_{it}$ is positive, which is statistically significant This result signifies that trade liberalization of the host country improving total factor productivity through spillover channels in the sample countries. The results are in line with the empirical findings of (Coe & Helpman 1995; Coe et al., 2008) or instance, the results supported by Coe & Helpman (1995) argued that "trade liberalization in intermediate goods is an important channel of international knowledge spillovers."

Table 6. Dependent Variable is TFP Growth

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
FD_{it}	-.04809*** (0.000)	-.05254*** (0.000)	-.02907*** (0.001)	-.03722*** (0.000)	-.0224*** (0.002)	-.01734** (0.013)
$GSIZE_{it}$	-.00098 (0.486)	-.00114** (0.043)	-.00106** (0.039)	-.00019 (0.878)	.0003 (0.790)	-.00026 (0.836)
$RDEV_{it}$	.0252* (0.080)	.00812 (0.572)	.00043 (0.972)	.01433 (0.320)	.0048** (0.043)	.00232 (0.998)
IQ_{it}	.01341 (0.146)	.01275 (0.168)	.01261 (0.160)	.01858** (0.030)	.0180** (0.038)	.02112** (0.027)
$INDUST_{it}$	.00058 (0.338)	.00082 (0.185)	.00024 (0.660)	.00132** (0.012)	.00108** (0.033)	-.00186 (0.234)
HC_{it}	.0588*** (0.004)	.0556** (0.010)	.0352** (0.035)	---------	---------	---------
TO_{it}	.0064*** (0.000)	---------	---------	---------	---------	---------
FDI_{it}	---------	.097** (0.022)	---------	---------	---------	---------
$TECH_{it}$	---------	---------	.0038** (0.040)	---------	---------	---------
$TO*HC_{it}$	---------	---------	---------	-.0012** (0.034)	---------	---------
$FDI*HC_{it}$	---------	---------	---------	---------	-.0047 *** (0.002)	---------
$TECH*HC_{it}$	---------	---------	---------	---------	---------	-.00155** (0.026)
Lag Dep	.5367*** (0.007)	.4525*** (0.001)	.7255*** (0.000)	.79880*** (0.000)	.2134*** (0.004)	.7689*** (0.009)
No of Obs	394	394	380	379	394	384
Number of Instruments	152	149	151	148	167	139
Serial Correlation	0.88	0.5594	0.3465	0.8627	0.5593	0.8979
Sargan Test	195.736	195.6324	184.1094	194.209	195.694	198.3461
P-Value	0.1871	0.2016	0.1730	0.2221	0.2007	0.1658

Note: ***, **, * shows significance level respectively at 1%, 5% 10%. Values in parenthesis are t-statistics. The dependent variable is total factor productivity growth.

The coefficient of the interactive term $(TO * HC)_{it}$ is statistically significant and negative, indicating that manufacturing sector productivity rises, as with an increase in technological spillover through trade openness with less absorptive capacity in sample countries. Similarly, the coefficient of human capital carries a significant and positive coefficient, which signifies the impact of human capital on total factor productivity in selected countries. This result is consistent with the findings of (Kuo & Yang, 2008; Coe et al. 2008), who argued that investment in human capital raises the output level through the channel of improving labor efficiency, increasing output productivity. In a similar line, several studies postulate that imported technology from developed to developing countries cannot be fixed or reinstate by firms' workers (firms employ foreign workers to install and replace imported technology). This condition will lead to enhance absorptive capacity to learn advanced technology and knowledge spillover. The interactive term significantly enters the model, and with a negative sign, technological spillover has been negatively related to absorption capacity in sample countries.

In model 2, technological spillover is captured through $(FDI)_{it}$ inflow, and absorption capacity is acquired with $(FDI * HC)_{it}$. The coefficient of $(FDI)_{it}$ inflow is positive and statistically significant, indicating that FDI inflow exerts a significantly positive impact on TFP growth in sample countries. In a similar line, Coe and Helpman (1995) argued that capital inflow is an energetic force for TFP growth. In addition, the net inflows of FDI play a crucial role in transferring knowledge spillover to the host country due to the imports of intermediate goods and capital goods, which will lead to the productivity of the manufacturing sector.

Similarly, model 3 captured the technological spillover effect through imported technology $(TECH)_{it}$, and absorptive ability is acquired through the interactive term of $(TECH * HC)_{it}$. The imported technology is a prominent channel of technological spillover. Its coefficient value is positive, revealing that imported technology positively contributes to TFP growth in selected countries. Our fitted values are in line with the findings of Kuo & Yang (2008). While, the interactive term $(TECH * HC)_{it}$ is captured absorptive capacity in the selected countries. The coefficient is negative and statistically significant, which indicates that technological spillover through the channel of technological imports cannot efficiently adopt by host country workers.

The coefficients of $(FD)_{it}$ and $(GSIZE)_{it}$ are negative which indicates significant impact on economic growth in selected countries. While, the empirical estimate of $(INDUST)_{it}$ and $(IQ)_{it}$ indicates that both the output growth of the manufacturing sector and the institution's role positively impact economic growth in selected countries. Similarly, $(RDEV)_{it}$ holds a positive sign that is statistically significant, indicating that research and development expenditure has a positive and significant impact on TFP growth in sample countries.

To analyze the effect of SEZs on economic growth, we have focused on those indicators that can describe SEZs. SEZs, as discussed, are a specified boundary that is intended to provide facilities to attract foreign investors. Pakistan has introduced nine special economic zones that are focused on uplifting the economy. This condition will help the investors to either relocate their firms or start a new firm in these zones. The

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economy can benefit from such kinds of investments in the short-run (static effect) and the long-run (dynamic effect). As SEZs are introduced, this ensures cash inflow or FDI to rise, more technological Transfer, and more trade openness. In this study, we have examined how these indicators affect the Asian economies where China has intervened through FDI, Trade Openness, and Technological Transfer. The results indicate that an increase in the indicators above positively affects the economy but not through the channel of Human Capital or by increasing the absorption capacity of the domestic labor. This result indicates that in these economies, the benefits experienced by the selected countries are static and not dynamic. To identify this, we have included human capital that has been inconsequential in this nexus.

Trade liberalization is an effective way to diffuse technology from developed to developing countries (Kousar et al., 2018). This condition increases the domestic firm's efficiency and enables it to compete in the international market. The Transfer of foreign technology through FDI and imports provides more significant opportunities to stimulate Domestic firms' productivity in developing countries (Keller, 2004). Chuang & Hsu (2004) argued that China is integrated with advanced countries to gain foreign information and technology to improve efficiency and economic output. The host countries acquire modern technology and skills due to foreign investment (Blomstrom & Kokko, 1998). Liu (2008) conducted a study about the Chinese manufacturing firms and concluded that FDI generates externalities in the form of technology transfer, i.e., FDI inflow increases human capital as the domestic firm establish a business relation with foreign-invested operations or move from foreign to domestic firms. In this connection, Walz (1997) argued that investment in the manufacturing sector due to FDI enhances the knowledge spillover in the Research and Development (R & R&D) sector and leads to a positive contribution to the recipient country's economic growth. Borensztein et al. (1998) found that FDI flows enhanced economic growth in developing countries. In a similar line, Wang & Wong (2009) argued that FDI affects economic growth through the channel of capital accumulation and total factor productivity (TFP). In addition, FDI is a more significant spillover than trade openness.

Similarly, the impact of knowledge spillover through FDI is smaller than trade openness (Tang & Koveos, 2008). Furthermore, the production technology of domestic firms is obsolete, and workers are low-skilled unable to learn from multinationals (Gorg & Greenway, 2004). Furthermore, Keller (2004) examined that technological diffusion is one primary source of productivity growth.

Numerous theoretical and empirical work indicates that the origin of knowledge in one country positively contributes to the technological advancement and productivity growth in neighboring countries. In this perspective, the existing literature (Grossman & Helpman, 1991; Coe & Helpman, 1995; Meyer & Sinani, 2009) concluded that trade openness and FDI are the main contributing components of technological spillover. At the same time, Miller & Upadhyay (2000) illustrated the positive effect of openness on total factor productivity in the cross-section of both developed and developing countries. Moreover, human capital and Total Factor Productivity (TFP) move positively in developing countries, whereas this relationship is damaging in advanced countries.

The innovative technology is primarily beneficial for the developing countries as from the developed ones. When developing countries import intermediate goods from the developed countries through import liberalization, these intermediate goods enhance the domestic firm's productivity. However, Edwards (1993) argued that open economies most effectively utilize innovative technology and where economic growth is faster than the closed economies. Chuang & Hsu (2004) emphasized that China's trade with advanced countries helps gain new technology, leading to improved domestic firms' productivity in China. Salinas & Aksoy (2006) argued that export-oriented strategy enhances the domestic firm's output that may positively contribute to economic growth. Therefore, it is beneficial for domestic industrialists to increase their productivity via the expansion of trade volume. This condition will raise the knowledge spillovers because of the links with foreign firms and the access to international markets. As Bresnahan et al. (2016) concluded, the manufacturing sector's growth is critical for sustainable economic growth in African countries.

Considering an instance of a developing country whose economy is liberalized with developed ones, are likely to gain more from technological externalities along with increase the stock of R&D. In the early 1990s, the new growth theory argued that technological advancement tends towards innovation, which leads to enhance the pace of economic growth. Substantial empirical work has been carried out to measure and explore the extent to which investment in R&D positively contributes to a sustainable country's production capabilities. The empirical findings concluded that investment in new technologies is beneficial not only for domestic countries but also for their counterparts. The increase in the foreign stock of R&D drives up TFP of developing countries due to imports of capital equipment and machinery (Seck, 2012).

The view of endogenous growth theory is different from the neoclassical due to the explicit introduction of R&D that affected long-run economic growth. The formation of human capital and R&D activities are the subject matter to increasing returns and lower diminishing returns to capital. Its views can be broadly classified into two groups in the sense of "engines of growth." First, several renowned studies (Lucas Jr, 1998; and Barro, 1990) emphasized that growth is generated through the positive externalities associated with the accumulation of either physical or human capital. In the 1990s, R&D spillovers across the countries have significantly boosted due to developing new growth models (Romer, 1990; Grossman & Helpman, 1991; and Aghion &Howitt, 1992). These models are known as investment-based growth models. The second group, referred to as growth, is created through technological progress. These models (Romer, 1990; Grossman & Helpman, 1991; Aghion & Howitt, 1992) are typically considered as R&D-based growth models.

Some of the existing studies measured host country absorptive capability through human capital accumulation. As LDC's importing an intermediate goods to follow technological imitation of developed countries. Borensztein et al. (1998) took data of 69 developing countries, spanning from 1970-89, and found that FDI enhances productivity in countries with minimum threshold stock of human capital. Furthermore, FDI positively contributes to economic growth only when a host country has sufficient absorptive foreign technologies (Griffith et al., 2003). In this connection, Lai et al. (2006) argued

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that long-run economic growth arises from improved absorptive capability and higher human capital stocks. Similarly, Coe et al. (2008) confirmed that domestic and foreign R&D capital stocks significantly impact TFP.

Furthermore, technology spillover affects long-run growth depends on the host country's human capital investment and degree of openness (Lai et al., 2006; Seck, 2012). In addition, Kuo & Yang (2008) explore a positive association between spillover from FDI and R&D expenditure of the host country. Absorptive ability determines the degree of technology spillover through institutional and financial development (Durham, 2004; Chee-Lip, 2015). Leahy &d Neary (2007) emphasize that R&D expenditure increases a firm's absorptive capacity and positively contributes profitability of a firm. They further argue that firms' R&D help absorb external knowledge from outside the industry will lead to a firm's absorptive capacity.

Human capital accumulation plays a crucial role in affecting the level of economic growth positively. As the human capital accumulation increases, the level of higher value-added goods has produced domestically. This condition may positively affect growth at the aggregate level (Barro, 1990; Gemmell, 1996). Studies like McGrath (2016) and Sarwar et al. (2021) examined the bi-directional causality and revealed that increased economic growth causes the accumulation of human capital positively due to higher investment. Similarly, Mincer (1996) states that an increase in the investment ratio positively increases economic growth. In addition, technology transferred from developed to developing countries has a statistically significant impact on the productivity of the host country.

Conclusion

As CPEC is considered a 1+4 portfolio in which the end goal of the whole project is to improve the overall infrastructure, including road, highways, and transmission lines, building and enhancing the energy sector to ensure the availability of energy to the industrial cooperation and finally construct a port. All of which only improves the growth of Pakistan when utilized appropriately in a definite sector. Therefore, the development of SEZs has also been included in the CPEC projects. Until now, 9 SEZs were notified, of which three are under consideration to be built as early as possible. As confirmed by the literature and the relevant authorities, the SEZs comprise those industries that are not currently operating in Pakistan. These will undoubtedly employ foreign technology and knowledge that the domestic workforce should possess. Therefore, these analyzes were intended to portray the existing situation in the labor market using the data of Asian countries. The SEZs are mostly functioning in these regions of the world. The existing analyzes are necessary to be taken into account as shortly when foreign technology will be employed how the domestic workforce will benefit still a question to be answered.

The current scenario depicts the picture that foreign technology helps in the enhancement of the overall economy. However, the role of domestic human capital does not play a sufficient role in transmitting this effect. We have observed that the prevailing knowledge and skills in the domestic labors are not compatible with the domestically available foreign technology. When this is the situation, how come the foreign industries and firms can positively affect the domestic laborers and uplift living standards. For this, we suggest the following policies in order to rectify this issue in the future.

An extensive study is required to identify the vocational and training skills required in CPEC projects that are possible only after identifying the foreign firms more likely to shift in Pakistan under the SEZs scheme. A reliable way to overcome this problem is a joint venture of domestic vocational training institutes with foreign firms. We can anticipate that the workforce can be enhanced and molded according to the projects under CPEC. Otherwise, the positions will remain vacant, and a massive chunk of domestic laborers will remain unemployed, giving all the benefits to the foreign workers to yield. In effect, opportunities in the lower segment will be more than the managerial positions that will benefit Pakistan in terms of static outcomes, though dynamic or long-run benefits should be concentrated.

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