Impact of Natural, Physical and Human Capital Formation on Economic Growth in Pakistan: An ARDL Analysis

Mubasher Ishfaq¹, Adnan Rasool², Muhammad Muzammil Asghar³, Sana Karim⁴ and Rashid Ahmad⁵

https://doi.org/10.62345/jads.2024.13.3.19

Abstract

Attaining sustained economic growth is one of the key objectives of any country to improve the well-being of its people and strengthen its economic position in the world. Capital formation is one of the crucial factors of economic growth as it promotes productivity, efficiency, and higher output growth. Therefore, this paper intends to analyze the impact of natural, physical, and human capital formation on economic growth in Pakistan by employing annual time series data from 1971 to 2020. Different econometric approaches such as unit root test, bound test, and ARDL model are utilized to estimate the results. The study found that labor force participation rate, physical capital, human capital, natural capital, FDI, and financial development are positively associated with economic growth in Pakistan. Instead of FDI, all the variables are found to be significantly related to economic growth in Pakistan. Considering the study's findings, it is concluded that capital formation is essential to progress the economy of Pakistan, so policymakers must concentrate on investing in physical infrastructure, improvement in health and educational facilities, and efficient utilization of natural resources to promote economic growth.

Keywords: Capital Formation, Natural Capital, Physical Capital, Human Capital, FDI, Economic Growth, ARDL.

Introduction

A country is affluent if it has effective economic growth-promoting policies, development initiatives, and human and financial resource mobilization techniques. Human resources are essential for greater economic development and progress to alleviate poverty (Sheikh et al., 2020), promote human development, and improve living conditions. Education and health are, therefore, key components in human capital formation (Shah et al., 2021a; Khatoon et al., 2021; Shah et al., 2021b). HC refers to the mental and physical skills people have earned via education, training, healthcare, and spiritual practices. Human capital generally refers to the ability of people to increase efficiency and productivity via education, skills, good health, and other factors (Todaro, 2002). Romer (1986) and Lucas (1998) highlight human capital investment as a key contributor to economic progress. These models provide sustainable growth endogenously from individual economic actors. The ability to attract other elements, such as physical investment, that also significantly contribute to the growth of income per

⁵Assistant Professor, School of Economics, Bahauddin Zakariya University Multan, Pakistan.



¹Assistant Professor, Department of Economics, Govt. Willayat Hussain Islamia Graduate College Multan, Pakistan. Email: <u>mubasherishfaq@gmail.com</u>

²MS Scholar, Faculty of Commerce, Law and Business Administration, Bahauddin Zakariya University Multan (Sub Campus Layyah), Pakistan. Email: <u>adnanrasool.fp@gmail.com</u>

³Research Scholar, School of Economics, Bahauddin Zakariya University Multan, Pakistan. Corresponding Author Email: <u>muzammilasghar42@gmail.com</u>

⁴*MPhil Scholar, Department of Economics, Ghazi University, DG Khan.*

OPEN BACCESS

Copyright: © This is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license. Compliance with ethical standards: There are no conflicts of interest (financial or non-financial). This study did not receive any funding.

capita, can be another human capital function. Since it has become clear that the efficient use of physical capital itself is based on human capital. The rate at which extra physical capital may be efficiently used is constrained if there is a lack of HC investment since the efficient use of physical capital requires technical, professional, and administrative personnel (Rahim et al., 2021).

The theory of EG can be understood as factors affecting the boost in output per capita in the long term. According to classical growth theory, capital expansion is crucial to output growth because it affects how quickly output grows. Adam Smith (1776) asserts that the amount of overall output is affected by the stock of capital in two ways. The first influence is direct; capital accumulation directly affects the output; the more input there is, the greater the output. The second factor is the indirect impact of capital on output in the shape of higher per capita productivity over the potential for greater specialization and labor division as these factors encourage higher productivity (Reza & Widodo, 2013). Gross fixed capital formation (GFCF) is employed as the most common proxy of physical capital. GFCF contributes significantly to GDP. The main three sectors that form GFCF are the public, private, and general government sectors. Both public and private investments are essential to favors productivity in the private sector in order to boost economic progress (Barro, 1991).

Conversely, natural resources are imperative for the economy but their effective utilization depends on the human resources and the level of technology in the country. Humans can grow economies and social structures to utilize other resources effectively, countries must increase human potential through quality improvement, skill development, and literacy to reduce unemployment and promote economic growth (Ali et al., 2012). The availability of NC has an influence on economic progress via various pathways, which can either be a curse or a gift for some countries. Natural resources that make up the abiotic portion of nature, such as minerals, water, and land, are thought to influence growth. Effective administration of NC can spur EG (Papyrakis & Gerlagh, 2004) and the revenue from the mineral, coal, and oil resources can be invested in other types of capital to promote economic growth (Sachs & Warner, 1997; Amini, 2018).

Despite being listed as one of the most crucial sectors in growth and development-related programs, human capital is one of the most underdeveloped sectors in Pakistan. Pakistan Vision 2025 wants to significantly increase educational levels and improve quality, which is similar to earlier policy statements. However, it is challenging to locate data demonstrating progress in this direction. Pakistan's economic growth is characterized by slowness and volatility, with the GDP growth rate falling to -1.27 percent in 2020 due to the COVID-19 shocks. However, due to a strong economic recovery, the GDP growth rate rose to 6.51 percent in 2021. However, after that, political instability and high inflation pressure led to a decline to 4.767 percent in 2022 and -0.0048 percent in 2023 (Pakistan Economic Survey, 2024). Despite abundant natural resources, strategic location, and large labor force, the country's inability to effectively harness its natural, physical, and human capital has hindered economic progress. Therefore, our study explores the influence of NC, PC, and HC on EG of Pakistan. By considering the effect of capital formation on EG, the study advises approaches to efficient utilization of resources, prioritizes investment in physical, health, and educational infrastructure, and addresses development challenges, ultimately augmenting sustainable economic growth in Pakistan.



Figure 1: Trends of GDP Growth, GCF, Life Expectancy, and Natural Resources Rents of Pakistan

Literature Review

The literature review on the relationship between capital formation and economic growth looks at a range of academic viewpoints and empirical research, with a particular emphasis on the contributions made by investments in human and physical capital to enhance productivity, technical developments, and sustainable economic development. Scholars investigate many models that associate capital accumulation with economic growth in both developed and developing nations. The literature review on the relationship between capital formation and EG is given as follows:

Relationship between Human Capital and Economic Growth

The study by Duan et al. (2022) explored the link between human capital, governance, economic freedom, and EG using data from BRICS countries from 2000 to 2018. This paper showed an inverted U-shaped link between EG and HC. Furthermore, the effect of HC on EG in the BRICS was optimistically moderated by governance. Similarly, Khatoon et al. (2021) explored the association between HC and EG utilizing data from 1990 to 2019. The results demonstrated that HC has optimistic effects on EG. In addition, Khan and Chaudhry (2019) explored the impact of HC on EG and employment in developing countries from 1996 to 2018. The outcomes exhibited that human capital characteristics were crucial and served as a catalyst for growth and job possibilities in developing countries. The study by Usman & Adeyinka (2019) analyzed the influence of the HC on EG using data from 1980 to 2016 in the ECOWAS member nations. Their study showed a positive impact of human capital on EG. Furthermore, Ogundari and Awokuse (2018) discovered the influence of HC on EG in SSA using panel data between 1980 and 2008. The outcomes demonstrated that HC contributes positively to the EG.

In the case of Nigeria, Adeyemi and Ogunsola (2016) investigated the influence of the formation of HC on EG utilizing data from 1980 to 2013. Their study showed a statistically negligible optimistic long-run association between education, life expectancy rate, expenditures on education, capital, and EG. Another study in Pakistan accompanied by Khan (2016) observed the influence of female HC on EG utilizing data from 1972 to 2012. Their study demonstrated a direct and substantial long-run link between female HC and EG whereas female HC has a beneficial but insignificant short-run effect on EG. Keeping in view the literature reviews the following hypothesis is developed:

*H*₁: *There is a positive relationship between human capital formation and economic growth*

Relationship between Physical Capital Formation and Economic Growth

Asghar et al. (2024) examined the economic influence of the construction sector in Pakistan from 1961 to 2020 in Pakistan. Their study found that GFCF, construction sector, manufacturing sector, agriculture, and services sector were contributing factors of EG in Pakistan. The study conducted by Garzarelli and Limam (2019) explored the link between physical capital (PC) formation and total factor productivity in 36 SSA countries between 1996 and 2014. Results showed that PC contributes more to overall growth than total factor productivity. Another study in South Africa was accompanied by Meyer and Sanusi (2019) that explored the causality between investment, employment, and EG using data from 1995 to 2016. The results revealed that domestic investment, employment, and EG had a long-term link. The study suggested that improved infrastructure and economic diversity must be enhanced to improve economic growth. In addition, Zahir and Rehman (2019) explored the effect of the trade deficit, exchange rate, and GFCF on the EG of Pakistan's economy from 1986 to 2013. The outcomes showed that trade deficit has a negative but substantial influence on GDP while GFCF has an optimistic and substantial influence on GDP. Additionally, the exchange rate has a negligible and favorable influence on GDP. One more study in Pakistan was conducted by Ali (2015) that studied the effect of GFCF on EG in Pakistan employing data from 1981 to 2014. Their study showed that physical capital positively and significantly influenced the EG. The analysis also concluded that the availability of skilled labor can increase productivity, and the export of finished goods can spur national EG. Keeping in view the literature reviews the following hypothesis is developed:

H₂: There is a positive relationship between physical capital formation and economic growth

Relationship between Natural Capital and Economic Growth

The study by Khan (2021) analyzed the effect of natural resources on EG in Pakistan from 1972 to 2013. The outcomes showed that NC has a favourable influence on EG while trade openness was negatively related to the EG in Pakistan. In addition, Hayat and Tahir (2021) analyzed the influence of natural resources on EG using data from 1970 to 2016. The study showed an optimistic and statistically substantial link between natural resources and EG. Furthermore, Shabbir et al., (2020) observed how natural resources affect EG in Pakistan. Based on data from 1972 to 2016, the results displayed that population growth and deforestation harm GDP while renewable water resources have a favourable impact on EG. Moreover, Sefemo and Segobai (2019) observed the relationship between NC and EG in Botswana employing data from 1994 to 2016. The analysis exhibited that the value of mineral assets used as a stand-in for natural capital greatly impacts Botswana's economic growth. The mining industry continues to be the foundation of the economy despite efforts by the government to diversify away from minerals. The study advised the nation to use mineral revenue to diversify its asset portfolio to strengthen PC and HC and archive sustained EG. The study by Amini (2018) examined how natural resources affect EG in developed and developing countries from 1996 to 2010. The results demonstrated that the EG was not significantly impacted by natural resources. Keeping in view the literature reviews the following hypothesis is developed:

H₃: There is a positive association between Natural capital formation and EG

Different studies analyzed the impact of capital formation on EG. It is observed in the literature that HC, NC, and PC play an imperative role in influencing the country's EG. Most of the studies analyzed the effect of HC formation on EG. However, limited literature was available on the influence of physical and natural capital on EG, especially in Pakistan, so this study considers three types of capital HC, PC, and NC as factors of EG in Pakistan. The outcomes of the study will provide significant implications for policymakers on how capital formation influences the EG in Pakistan and what steps need to be taken to boost the level of HC, natural capital, and PC to enhance the level of EG.

Data and Methodology

This paper used the yearly data of Pakistan from 1971 to 2020 to examine the impact of natural, physical, and HC on EG in Pakistan. The data was collected from World Development Indicators. The neoclassical model demonstrates that EG is mainly caused by labor and capital, therefore, the study used both labor and capital as elements of EG:

Output = f(Labor, Capital)

(1)

However, to better comprehend the influence of capital on EG, this study categorized capital into physical, human, and natural capital. In addition, the FDI and FD are added to the model as both of these factors are also important in influencing the EG. Therefore, the following model is established to evaluate the influence of NC, PC, and HC formation on EG in Pakistan: $EG_t = \beta_o + \beta_1 LFPR_t + \beta_2 PC_t + \beta_3 HC_t + \beta_4 NC_t + \beta_5 FDI_t + \beta_6 FD_t + u_t$ (2)

Where EG refers to economic growth, LFPR indicates labor force participation rate, PC refers to the physical capital, HC indicates human capital, NC specifies natural capital, FDI refers to foreign direct investment, FD indicates financial development and u_i indicates the error term.



For data analysis, different data estimation techniques are employed. Firstly, the unit root estimation is accompanied to assess the stationarity level of variables. The ADF (Augmented

Dickey-Fuller) test is applied to determine the integration order of variables. Secondly, cointegration analysis is conducted using the ARDL bound test. Thirdly, the autoregressive distributive lag model (ARDL) is utilized to evaluate the long-run coefficient of variables. The benefit of this model is that it also offers a short-run error correction form of the model. Another benefit of the ARDL model is that it can also be applied when variables have mixed integration order (Pesaran et al., 1999). Additionally, the ARDL estimates provide reliable outcomes in the absence of heteroscedasticity and serial correlation in a model. Therefore, different model diagnostic tests are employed to address the issues of autocorrelation, heteroskedasticity, residual normality, and model misspecification. The following is the equation of the ARDL long-run model:

$$\Delta(EG)_{t} = \alpha + \beta_{1}(EG)_{t-1} + \beta_{2}(LFPR)_{t-1} + \beta_{3}(PC)_{t-1} + \beta_{4}(HC)_{t-1} + \beta_{5}(NC)_{t-1} + \beta_{6}(FDI)_{t-1} + \beta_{7}(FD)_{t-1} + \sum_{i=1}^{a_{1}} \delta_{1}\Delta(EG)_{t-i} + \sum_{i=0}^{a_{2}} \delta_{2}\Delta(LFPR)_{t-i} + \sum_{i=0}^{a_{3}} \delta_{3}\Delta(PC)_{t-i} + \sum_{i=0}^{a_{4}} \delta_{4}\Delta(HC)_{t-i} + \sum_{i=0}^{a_{5}} \delta_{5}\Delta(NC)_{t-i} + \sum_{i=0}^{a_{6}} \delta_{6}\Delta(FDI)_{t-i} + \sum_{i=0}^{a_{7}} \delta_{7}\Delta(FD)_{t-i} + \varepsilon_{t}$$

$$(3)$$

Where β_2 , β_3 , β_4 , β_5 , and β_6 are the long-run coefficients of LFPR, PC, HC, NC, FDI, and FD respectively while ε_t is the error term.

The short-run ECM ARDL model is as follows:

$$\Delta(EG)_{t} = \alpha + \sum_{i=1}^{a_{1}} \lambda_{1} \Delta(EG)_{t-i} + \sum_{i=0}^{a_{2}} \lambda_{2} \Delta(LFPR)_{t-i} + \sum_{i=0}^{a_{3}} \lambda_{3} \Delta(PC)_{t-i} + \sum_{i=0}^{a_{4}} \lambda_{4} \Delta(HC)_{t-i} + \sum_{i=0}^{a_{5}} \lambda_{5} \Delta(NC)_{t-i} + \sum_{i=0}^{a_{6}} \lambda_{6} \Delta(FDI)_{t-i} + \sum_{i=0}^{a_{7}} \lambda_{7} \Delta(FD)_{t-i} + \omega ECM_{t-1} + \varepsilon_{t}$$
(4)

Where λ_2 , λ_3 , λ_4 , λ_5 , and λ_6 are the short-run coefficients of LFPR, PC, HC, NC, FDI, and FD respectively, ω is the coefficient of error correction term, and ε_t is the error term.

Table 1: Description of Variables						
Variables	Descriptions					
EG	Economic growth	GDP Per capita (Current LCU)				
LFPR	Labor force participation rate	Labor force/working-age population				
PC	Physical capital	Gross capital formation growth rate				
HC	Human capital	Life expectancy at Birth				
NC	Natural capital	Total Resource Rents Percentage of GDP				
FDI	Foreign direct investment Inflows	FDI Inflows Current US\$				
FD	Financial development	Domestic Credit to Private Sector (Percent				
		of GDP)				

Data Analysis

Descriptive Analysis

Table 2 displays that the mean values of EG, LFPR, PC, HC, NC, FDI, and FD in Pakistan are 6.162, 48.974, 3.593, 61.233, 1.235, 19.166, and 27.528, respectively. Likewise, the maximum values of EG, LFPR, PC, HC, NC, FDI, and FD are 7.391, 52.363, 18.532, 67.428, 2.617, 22.444, and 30.893, respectively. In contrast, the minimum values of EG, LFPR, PC, HC, NC, FDI, and FD are 4.598, 29.960, -9.696, 53.192, 0.181, 0.000, and 23.974, respectively. The distributions of EG and NC are positively skewed whereas the distributions of LFPR, PC, FDI, and FD are negatively skewed. Lastly, the distributions of EG, PC, NC, HC, and FD are platykurtic while LFPR and FDI have leptokurtic distributions.

Table 2: Descriptive Estimates							
Variables	Mean	Maximum	Minimum	S.D.	Skewness	Kurtosis	
EG	6.162	7.391	4.598	0.700	0.009	2.321	
LFPR	48.974	52.363	29.960	4.797	-3.395	13.424	
РС	3.593	18.532	-9.696	6.304	-0.106	2.805	
НС	61.233	67.428	53.192	4.151	-0.244	1.925	
NC	1.235	2.617	0.181	0.569	0.703	2.895	
FDI	19.166	22.444	0.000	3.384	-3.780	21.741	
FD	27.528	30.893	23.974	2.029	-0.073	1.926	

Tabl 2 n 4: Eat:

Correlation Analysis

The correlation coefficient between the pairs of variables is given in Table 3. The findings exhibit that EG is positively correlated to the LFPR (0.465), human capital (0.875), natural capital (0.573), foreign direct investment (0.748), and financial development (0.879) while negatively correlated to the physical capital (-0.041).

Table 3: Correlation Matrix							
Variables	EG	LFPR	РС	НС	NC	FDI	FD
EG	1.000						
LFPR	0.465	1.000					
PC	-0.041	0.121	1.000				
HC	0.875	-0.460	0.139	1.000			
NC	0.573	0.404	0.081	-0.547	1.000		
FDI	0.748	0.314	-0.017	-0.666	0.495	1.000	
FD	0.879	0.486	-0.120	-0.992	0.573	0.709	1.000

Unit Root Analysis

Unit root analysis is accompanied by employing the ADF test and estimates are given in Table 4. The variables LFPR, PC, and FDI are turned to be stationary at level. In contrast, the variables EG, HC, NC, and FD are integrated at 1st difference. Hence, the mixed integration order advises that the ARDL model can be used for the parameter estimations.

Table 4: ADF Test Estimates						
Variables	Level		1 st Differe	nce	0	
	T-stat	Prob.	T-stat	Prob.	— Outcomes	
EG			-6.808	0.000	I(1)	
LFPR	-5.590	0.000			I(0)	
РС	-5.464	0.000			I(0)	
НС			-1.949	0.050	I(1)	
NC			-7.453	0.000	I(1)	
FDI	-4.061	0.003			I(0)	
FD			-4.829	0.0000	I(1)	

Cointegration Analysis

ARDL bound test is vital in analyzing a model's long-run cointegration among variables. Table 5 shows that the F-statistic value (7.6190) is higher than upper bound values at the 1 percent level, suggesting a long-run cointegration between EG, LFPR, PC, NC, HC, FDI, and FD. Therefore, we can proceed further to the long-run estimation of the parameters.

Statistic	Value	K	
F	7.6190	6	
Significance	I0 Bound	I1 Bound	
10%	2.12	3.23	
5%	2.45	3.61	
2.5%	2.75	3.99	
1%	3.15	4.43	

Table 5: Bound Test Analysis

ARDL Analysis

The ARDL long-run estimates of NC, PC, and HC impacts on EG in Pakistan are reported in Table 6. First, analyzing the association between PC and EG, the results show that physical capital is positively and significantly (at a 1 percent level) linked with Pakistan's EG. The PC's coefficient directs as the PC surges by a unit, the EG also improves by 0.0145 units. It recommends that improvement in physical capital in a country enhances labor productivity (Shah et al., 2021b), physical infrastructure, and job creation which are key in promoting EG. Positive association between PC and EG was also confirmed by Asghar et al., (2023), Khan (2021), Shah et al., (2020), and Shahzad (2015). In addition, the findings also display that HC is positively and significantly (at 1 percent) related to EG. The coefficient HC exhibits as it augments by a unit, and the EG also progresses by 0.3553 units. It infers that HC formation improves the specialization, productivity, and efficiency of inhabitants, which in turn leads to the promotion of the EG. Similar outcomes were also established by Pelinescu (2015), Shahzad (2015), and Ali et al., (2012). Furthermore, a positive and significant link is also established between NC and EG. The NC's coefficient shows EG augments by 0.4827 units as NC increases by a unit. It points out that high natural resources can lead to attracting more capital inflows, development of new industries, and promoting agriculture productivity which are crucial to promote EG. The positive link between NC and EG was also established by Behbudi et al., (2010) and Erum & Hussain (2019). FD is also essential to improve the economic progress of any country. The analysis shows that FD is positively and significantly linked with Pakistan's EG. The FD's coefficient displays that as it upsurges by a unit, the EG also upturns by 0.7458 units. FD in a country improves credit facility availability so that people can do economic transactions timely and effective. Improvement in credit facilities also increases the investment level (Iram et al., 2024) that are crucial in promoting employment opportunities and EG in a country. The positive relationship between FD and EG was also confirmed by Khan (2021), and Asghar et al., (2024b).

DV: Economic Growth						
Variables	Coefficient	S.E.	t-Statistic	Prob.		
LFPR	0.0239	0.0180	1.3232	0.2007		
РС	0.0145	0.0049	2.9217	0.0084		
НС	0.3553	0.1381	2.5721	0.0182		
NC	0.4827	0.1155	4.1774	0.0005		
FDI	0.0008	0.0348	0.0240	0.9811		
FD	0.7458	0.2260	3.2985	0.0036		
С	-39.7864	15.4798	-2.570216	0.0183		

Table 6: ARDL Long-Run Estimates

In ARDL short-run analysis, the error correction term is important to analyze. The ECM term shows the convergence towards equilibrium if any short-run disturbances occur. The value of the ECM term should be negative and also statistically significant. The negative value of the ECM term exhibits convergence to the equilibrium, while the positive value exhibits divergence to the equilibrium. Table 7 displays the outcomes of ARDL short-run estimates. It is discovered that ECM has a negative (-0.5377) and statistically significant value. It implies that the errors become adjusted at the rate of 53.77 percent when transitioning from the short-run to the long-run equilibrium.

Table 7: ARDL Short-Run Estimates								
Dependent Va	Dependent Variable: EG							
Variables	Coefficient	S.E.	t-Statistic	Prob.				
D(LFPR)	0.0058	0.0033	1.7767	0.0908				
D(PC)	0.0034	0.0012	2.7125	0.0134				
D(HC)	-12.3721	3.6600	-3.3803	0.0030				
D(NC)	0.0912	0.0307	2.9690	0.0076				
D(FDI)	0.0192	0.0200	0.9615	0.3477				
D(FD)	0.5865	0.2019	2.9042	0.0088				
ECM(-1)	-0.5377	0.1595	-3.3707	0.0030				

Model Diagnostic Analysis

The issues of heteroskedasticity, autocorrelation, residuals normality, and model misspecification are examined in a study. The Breusch-Pagan-Godfrey (BPG) and Breusch-Godfrey (BG) tests indicate the absence of heteroskedasticity and autocorrelation in a model, respectively. Similarly, Jarque-Bera (JB) tests indicate the residuals are normally distributed and the Ramsey Reset (RR) test specifies the model is correctly specified.

Table 8: Model Diagnostic Analysis						
Issue	Test	Statistic	Prob.	Outcomes		
Heteroskedasticity	BPG	1.3501	0.2486	Absent		
Autocorrelation	BG	1.8912	0.1054	Absent		
Residual Normality	JB	1.0507	0.5913	Normally Distributed		
Model Misspecification	RR	1.8305	0.1288	Correctly Specified		

Lastly, recursive residuals of CUSUM and CUSUM of squares are used to assess the model stability. Figure 3 shows that the estimated line is within the upper and lower bound values at a 5 percent significance level, so we can conclude that the model used in the study is dynamically stable.



Conclusion and Policy Implications

Promoting the growth of the economy is the strategic ambition of every country in the world as sustained EG can reinforce the country's global economic position. Therefore, analyzing what aspects are responsible for the EG of a country is key. The current study considers the role of NC, PC, and HC in impacting the EG of Pakistan by employing data from 1971 to 2020. The results show that LFPR, PC, and FDI are established to be stationary at level. In contrast, the variables EG, HC, NC, and FD are integrated at 1st difference. Similarly, the bound test confirms the existence of long-run cointegration among EG, LFPR, PC, NC, HC, FDI and FD. The ARDL long-run estimates show the positive association between HC and EG as imprudent in HC promotes the specialization, productivity, and efficiency of inhabitants which are imperative to improve the economy. Similarly, PC and EG also turn out to be positively associated indicating that improvement in physical capital can enhance labor productivity, physical infrastructure, and job creation which are key to promoting EG. In addition, the positive link between NC and EG is also established in a study suggesting that high natural resources can lead to attracting more capital inflows, and the development of new industries that can augment the economy of any country. The paper also found a positive and significant relationship between FD and EG. Lastly, the positive but insignificant influence of LFPR and FDI on EG is established in a study. Considering the study's findings, it is concluded that capital formation is imperative to promote Pakistan's economic progress, so policymakers must concentrate on promoting the capital of a country.

Our study has also some policy implications. First, to increase life expectancy, policymakers must focus on the health sector of the economy because a healthy person may contribute more effectively to economic activity. Poor people should have access to basic healthcare facilities. Additionally, the government needs to fund facilities for greater sanitation, clean water, and child-mother healthcare. Second, to increase the physical capital of a country government should invest in projects that increase the employment opportunities for the inhabitants of a country, in this way economic growth of a country could also be boosted. Third, the effective management of natural resources should be maintained to get more desirable results. Fourth, the financial sector should be strengthened to increase the provision of credit facilities to the people. Lastly, government investment in education should be increase the country's effective and productive labor force which can have a long-term multiplicative effect on the economy.

References

- Adeyemi, P. A., & Ogunsola, A. J. (2016). The impact of human capital development on economic growth in Nigeria: ARDL approach. *IOSR Journal of Humanities and Social Science*, 21(3), 1-7.
- Ali, G. U. L. Z. A. R. (2015). Gross fixed capital formation & economic growth of Pakistan. *Journal of Research in Humanities, Arts and Literature Applied*, 1(2), 21-30.
- Ali, S., Sharif. I. C., & Farooq, F. (2012). Human Capital Formation and Economic Growth in Pakistan. *Pakistan Journal of Social Sciences (PJSS)*, *32*(1), 229-240.
- Amini, A. (2018). Studying the effect of abundance of natural resources on economic growth. *European Journal of Sustainable Development*, 7(1), 201-201.
- Asghar, M. M., Tanzeel, M., Ullah, S., & Hussain, S. (2024). Analyzing the Economic Impact of Construction Sector in Pakistan. *Zakariya Journal of Social Science*, *3*(1), 21-34.
- Asghar, M. M., Safdar, R., Zubair, M., & Hanif, M. (2024b). Exploring the Influence of Financial Development, Institutional Quality and Trade Openness on Inclusive Growth in SAARC Countries. *Pakistan Journal of Humanities and Social Sciences*, *12*(2), 1450-1461.

- Asghar, M. M., Sultana, R., Ullah, S., & Arshad, M. (2023). Analyzing the External Debt and Exports-Led Growth Hypothesis in Selected Asian Countries. *Zakariya Journal of Social Science*, 2(2), 43-55.
- Barro, R. J. (1991). Economic growth in a cross-section of countries. *The quarterly journal of economics*, *106*(2), 407-443.
- Behbudi, D., Mamipour, S., & Karami, A. (2010). Natural resource abundance, human capital and economic growth in the petroleum exporting countries. *Journal of Economic Development*, *35*(3), 81-102.
- Duan, C., Zhou, Y., Cai, Y., Gong, W., Zhao, C., & Ai, J. (2022). Investigate the impact of human capital, economic freedom and governance performance on the economic growth of the BRICS. *Journal of Enterprise Information Management*. 35(4/5), 1323-1347.
- Erum, N., & Hussain, S. (2019). Corruption, natural resources and economic growth: Evidence from OIC countries. *Resources Policy*, 63, 101429.
- Garzarelli, G., & Limam, Y. R. (2019). Physical capital, total factor productivity, and economic growth in sub-Saharan Africa. *South African Journal of Economic and Management Sciences*, 22(1), 1-10.
- Hayat, A., & Tahir, M. (2021). Natural resources volatility and economic growth: evidence from the resource-rich region. *Journal of risk and financial management*, *14*(2), 1-17.
- Iram, M., Zameer, S., & Asghar, M. M. (2024). Financial Development, ICT Use, Renewable Energy Consumption and Foreign Direct Investment Impacts on Environmental Degradation in OIC Countries. *Pakistan Journal of Humanities and Social Sciences*, *12*(2), 1303-1315.
- Khan, M. (2021). Effect of Natural Resources on Economic Growth in Pakistan: A Time Series Analysis. *Asian Journal of Economic Modelling*, 9(1), 29-47.
- Khan, M. K. (2016). Contribution of female human capital in economic growth: an empirical analysis of Pakistan (1972–2012). *Quality & Quantity*, *50*(2), 709-728.
- Khan, R., & Chaudhry, I. S. (2019). Impact of human capital on employment and economic growth in developing countries. *Review of Economics and Development Studies*, *5*(3), 487-496.
- Khatoon, R., Javed, I., & Hayat, M. M. (2021). Impact of human capital on economic growth: A case study of Pakistan. *Journal of Social Sciences Advancement*, 2(2), 64-69.
- Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of monetary economics*, 22(1), 3-42.
- Meyer, D. F., & Sanusi, K. A. (2019). A causality analysis of the relationships between gross fixed capital formation, economic growth and employment in South Africa. *Studia Universitatis Babes-Bolyai Oeconomica*, 64(1), 33-44.
- Ogundari, K., & Awokuse, T. (2018). Human capital contribution to economic growth in Sub-Saharan Africa: does health status matter more than education?. *Economic Analysis and Policy*, *58*, 131-140.
- Pakistan Economic Survey (2023-24). *Overview of the Economy*. Ministry of Finance, <u>https://www.finance.gov.pk/survey/chapter_24/overview%202023-24.pdf</u>
- Papyrakis, E., & Gerlagh, R. (2004). The resource curse hypothesis and its transmission channels. *Journal of Comparative Economics*, *32*(1), 181-193.
- Pelinescu, E. (2015). The impact of human capital on economic growth. *Procedia Economics and Finance*, 22, 184-190.
- Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American statistical Association*, *94*(446), 621-634.
- Rahim, S., Murshed, M., Umarbeyli, S., Kirikkaleli, D., Ahmad, M., Tufail, M., & Wahab, S. (2021). Do natural resources abundance and human capital development promote

economic growth? A study on the resource curse hypothesis in Next Eleven countries. *Resources, Environment and Sustainability*, *4*, 1-8.

- Reza, F., & Widodo, T. (2013). The Impact of Education on Economic Growth in Indonesia. *Journal of Indonesian Economy & Business*, 28(1), 23-44.
- Romer, P. M. (1990). Endogenous technological change. *Journal of political Economy*, 98(5, Part 2), S71-S102.
- Sachs, J. D., Warner, A., Åslund, A., & Fischer, S. (1995). Economic reform and the process of global integration. *Brookings papers on economic activity*, 1995(1), 1-118.
- Sefemo, F. D., & Segobai, B. (2019) .The Effect of Natural Capital on Economic Growth in Botswana. *International Journal of Development and Economic Sustainability*, 7(2), 48-61.
- Shabbir, A., Kousar, S., & Kousar, F. (2020). The role of natural resources in economic growth: new evidence from Pakistan. *Journal of Economics, Finance and Administrative Science*, 25(50), 221-238.
- Shah, S. Z. A., Asghar, M. M., & Riaz, U. (2020). Exploring the Factors Affecting Economic Growth in Pakistan. *Global Social Sciences Review*, 5(3), 400-409.
- Shah, S. Z. A., & Riaz, M. M. A. U. (2021b). Role of education and labor force participation in influencing women empowerment in Pakistan: A case study of District Khanewal. *Pakistan Social Sciences Review*, 5(4), 601-614.
- Shah, S. Z. A., Asghar, M. M., & Riaz, U. (2021c). Does Urbanization Influence Agriculture Output in Pakistan?. *International Review of Basic and Applied Sciences*, 9(3), 368-376.
- Shah, S. Z. A., Asghar, M. M., & Zulqurnain, A. (2021a). Women Education and its Returns in Pakistan: A Case Study of Multan District. *Asian Social Studies and Applied Research*, 2(3), 468-474.
- Shahzad, F. (2015). Role of human capital on economic growth: A case study of Pakistan. *International Journal of Accounting and Economics Studies*, *3*(1), 20-24.
- Sheikh, M. R., Akhtar, M. H., Asghar, M. M., & Abbas, A. (2020). Demographic and economic aspects of poverty. *Pakistan Economic and Social Review*, 58(1), 131-160.
- Todaro, M. (2002). Economic Development. 8th edition, Longman, New York London.
- Usman, F. K., & Adeyinka, O. B. (2019). Effect of human capital development on economic growth of ECOWAS member states. *Advances in sciences and humanities*, 5(1), 27-42.
- Zahir, S., & Rehman, Z. (2019). Linkage between gross fixed capital formation, trade deficit, exchange rate and economic growth of Pakistan. *Journal of Managerial Sciences*, 14(4), 48-57.