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Rate of Returns to Investment in Education and Human Capital in Pakistan

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ABSTRACT

It is widely acknowledged that physical or natural resources are not the only source of growth in a country in this era of knowledge. Human capital is considered more important to define the type and rate of economic and social growth; so, making every effort to initiate human capital development at all levels is, therefore, crucial for a developing nation like Pakistan. In this context, the goal of this study is to determine the significance of important factors in Pakistan's growth of human capital. This study utilized employment, economic growth, technology, and wages as the independent variables while dependent variable was human capital (HC). Time series data is extracted from World Development Indicators (WDI) for the period of 1990 -2020. This study used a Vector Error Correction Model (VECM) to obtain short- and long-term empirical estimates while study employed Variance Decomposition to find relative contribution of modeled variables in the HC. Moreover, study employed Generalized Impulse Response Function (GIRF) to examine the response in HC in predicted 10 quarters. Results of this study indicate

that employment, economic growth, technology, and wages all have a long-term positive impact on HC. Moreover, variance decomposition results indicate that, employment in industry (EIND), employment in services (ES), labour force participation total (LFPT), GDP, technology (TECH), and wages (W) have relative contribution 6.054%, 5.013%, 5.797%, 1.635%, 3.707%, and 15.179% respectively in HC in the long run period. This study suggest that policy makers should keep in view employment, economic growth, technology and wages for increasing Human Capital.
Keywords: human capital, VAR, employment, economic growth, technology, wages, variance decomposition, impulse response.

INTRODUCTION

Human capital refers to people who have knowledge, talent, and experience. Education, training, skills, fitness, and other attributes considered favorably by employers like commitment and timeliness are all examples of human capital. The purpose behind HC is to increase economic profitability and productivity. A nation's chances of productivity and success increase with the amount of investment it makes in its workforce. An economy can expand and succeed due to the macroeconomic benefits of human capital. Contrary to land, labour, or permanent capital, human capital is interchangeable but cannot be moved.

Human capital is the financial gain from a worker's skills and abilities. According to the human capital theory, learning more and getting more experience can increase someone's capacity for productivity. Human capital is a term that has a lot of different definitions. Therefore, HC is defined as a person's right to obtain revenue through the application of a specific set of talents or expertise, or as people's ideas, abilities, or practice that allows them to be economically beneficial. Human capital is a crucial element in strengthening a company's resources and workforce in order to increase productivity and to secure a comparative benefit (Schultz, 1993). According to Becker (2002), HC is an individual's personal store of knowledge, talents, and attributes resulting from inherent distribution, future public investment, and expertise. While, according to Armstrong (2006), a bundle of abilities that individuals develop, sustain, and use is known as human capital. Furthermore, Davenport and Prusak (1998) state that people have capacities, behaviors, personal energy and these elements constitute the human capital they bring to their misery. Based on above stated definitions this study stated that individuals that are skilled, healthy and educated are referred to as human capital.

The knowledge-based economy overcomes the resource-based economy as the dominant force in the world economy. In this era of information, a country that is growing faster emphasizes its human capital. Furthermore, in Global economy, knowledge-based components like human skills and trade secrets play important role in economic prosperity. Knowledge-based economy emphasized that education and knowledge is recognized as fruitful and business product that can generate money for people, businesses, and for the economy. Today economies are heavily reliant on

intellectual qualities rather than physical or natural resources. Furthermore, the ability, skill and knowledge of human beings provide a strong foundation for the economic prosperity of developing nations (Brinkley, 2006) and considered as important source for creation of wealth.

It has been recognized worldwide that one of the most important sources of a country's prosperity is its human capital. Country with more human capital is said to be developed more rapidly as compared to a country that owned low human capital. Without a solid foundation of human capital, a nation cannot grow; human capital is defined as skilled labour, or educated human beings, usually companies referred this term to recognize the value of its staff. Human capital provides a basis for economic development and is highly appreciated in developed nations.

Due to globalization and migration, skilled employees become able to find appropriate jobs in higher-income countries. This may have negative consequences for developing economies, as they will lose their greatest human resources. Companies and governments that manage human capital effectively and efficiently grow faster. In terms of employment rates and incomes, skills increase the labour market outcomes. In nations or in labor-surplus countries, where there is an excess of labour, the concept of human capital is more important. Due to large birth rate or because of climatic conditions in these countries, they have a greater capacity of labour by nature. In these countries, surplus labour is a human resource that is more abundant than physical capital. This human resource can swiftly transform into HC with the right moral values, moral wellbeing, and educational opportunities.

A straightforward statistic for assessing the profitability of a project is return on investment (ROI). This could be the expected return on a manufacturing expansion, the return on an investment in real estate, or the return on a stock purchase. Investments are unquestionably profitable if the return on investment (ROI) is positive. On the other hand, if other opportunities with higher ROIs are available, these signs can help investors reject or choose the best options. Additionally, investors avoid negative ROIs, which signify a net loss.

Return on investment (ROI) is a method of determining how much profit an investment creates in relation to its cost. The concept of return on education is the ratio of an individual's lifetime earnings to the return on investment of educational costs. The rate of return on that investment must be positive and greater than the alternate rate of return in order for that to be financially justified.

Return to investment in education has received a small consideration in the existing literature. Empirical investigation about the role of returns on investment in education is essential for a variety of reasons. Firstly, returns to education motivate typical family members to enroll their kids in school or in employment. Secondly, the returns to education influence people's choices of occupations and industries. Thirdly, the government and institutions make decisions based on estimations of educational returns. As a result, updated returns to education in Pakistan must be understandable. Individuals examine the projected incentives of return on investment in education not just in quantitative terms, but also in qualitative terms

when they decide to put their kids in school or send them to work, as well as to decide how much to invest.

The association among ROI in education and economic growth is highly investigated among scholars (Dickens, Sawhill, & Tebbs, 2006; Ganegodage & Rambaldi, 2011; Hamdan & Hamdan, 2020; Ifionu & Nteegah, 2013; Jorgenson & Fraumeni, 1992; Teles & Andrade, 2008). However, analyzing the connection between ROI in education and human capital is necessary because ROI in education enhances HC.

LITERATURE REVIEW

Investment in Education

Theorists, businessmen, and legislators all accept that a country's true asset is its educational system. "A population's level of knowledge may be a good indicator of how much society will spend on that group. Understanding of the knowledge, like many other educational features, is a part of the creative factors." (Salade, 1998). The primary objective of education is to increase life satisfaction by expanding one's choices in life. It opens up new horizons for individuals in languages, poetry, painting, music, and worldwide variety. Those who have profited from such a proper education over years haven't ever wondered that they might earn a higher reward (Galbraith, 1997).

Among the most important findings of modern educational research is that investing in people's training and support is indeed a positive regulator and a basic instrument to foster human skills, particularly in the current atmosphere of innovation. Workers with a low education level, on the other hand, may provoke a variety of obstacles mostly in jobs market, just because they're not able to do a certain task, but because they have not the appropriate degree or certification to gain access to a given social and professional position. As a result, the supplemental revenue a student expected to receive as an outcome of each year of learning, the marginal revenue of human capital investment, may be indicative of the willingness and the desire to improve education.

2.2 The Advantages of Investing in Human Capital through Education

The labour market has a socioeconomic influence on education and this has a significant impact on whether or not to engage people in getting education. University graduates typically have easier employment conditions since they are more confident than someone with no education or training. Numerous studies have demonstrated that efforts associated with the various educational stages are rewarded with greater rewards as well as also in the duration of training or certification period. More educated people are more likely to have higher incomes than less educated people. We must keep in mind that a "person is much more than a product" and also that families do not raise their children to be "goods" on the job market.

Investment in HC: Experience of Developed Nations

Governments offer significant help to people by providing financial aid to

students in countries where people cannot contribute to the cost of their own education. These countries offer a range of financing options for higher education, including direct funding, indirect funding, aid for students' living expenses, financial aid for education, or a mix of the two. Specifically, in the United States, Italy, Belgium, Germany, Netherlands, Spain, and in Geneva, over 90% of the government spending on higher education is directed to academic institutions. Higher education is an excellent investment that will assist both the individual and the socioeconomic growth of society over the long-term period.

A person's salary improves with their level of education and is almost always higher than the national average. The advantages are easier to see in industrialized countries. In the USA, the disparity between the average salaries of college graduates and those with only a high school diploma was between 40 and 50 percent in the early 1960s, and it expanded after that. Personal income has consistently increased in nations such as in United States and in China during the past century and even before that, the reason is the development of fundamental knowledge.

Existing Empirical Literature Related to Factors Affecting HC

In the existing literature, the researcher mostly examined the relationship among FDI, use of ICT, and infrastructure with HC like Gupta, Jain, and Nagpal (2019), Badri, Badri, and Cham (2019), Wang (2011). The findings of these researches indicate that FDI, use of ICT, and infrastructure all affect human capital significantly. Furthermore, human capital is increased due to an increase in FDI, ICT, and infrastructure.

Farooqi, Makhdum, and Yaseen (2020) examined “the effect of ICT investments on several aspects of HC in developing nations.” Study selects 67 developing countries and used data from WB (World Bank) covering the years from 2000 to 2018. The results indicate that ICT investment has a variety of effects on aspects of human development. Badri et al. (2019) conducted study on the role of ICT in human development in 15 developing countries and collected data from WDI for the time period of 2012 to 2017 and found that ICT was shown to be very important in the progress of HDI.

Mohanty, Nayak, and Chatterjee (2016) investigated whether infrastructure had an impact on human development, evidence from India's Odisha by utilizing data from “World Bank, the CMIE Database, publications from the Central and State Governments, and the Reserve Bank of India" at the years of 1993, 1997, and 2007. The study's findings show a strong relationship between infrastructural development and human capital.

Similarly, the role of infrastructure in HC is examined by Kusharjanto and Kim (2011) in the country of Indonesia, and findings of the study revealed that all available indicators of infrastructure positively and significantly affect HDI.

Sapkota (2014) conducted a study on “Access of infrastructure and human development.” Study selected 91 developing countries and used data from the HDI database of UNDP for the 1995 to 2010 period of time. The study’s findings show that several infrastructure variables have a positive and significant impact on HDI

and on its three component indexes.

Azam, Khan, Zainal, Karuppiah, and Khan (2015), claim that FDI has a statistically significant or favorable impact on human capital in the developing nations. Similarly, the role of FDI in human capital development in the middle- and low-income nations is investigated by Sharma and Gani (2004), by utilizing the data from World Development Indicators (WDI) for 1975-1999 time period and found that human development has been positively affected by FDI. Additionally, the impact of FDI on the human development index is investigated by Gökmenoğlu, Apinran, and Taşpınar (2018) by utilizing data from WDI (2015) found that FDI has a positive and significant impact on HDI.

Employment and Human Capital

Typically, researchers look at how human capital affects employment, such as Simon (1998) examined HC and metropolitan employment development in American urban areas from 1940 to 1986 period of time and found positive association among HC and employment growth. Similarly, Winters (2013) conducted a study in USA using data from IPUMS for the period of 1980- 2000 and discovered that the presence of local human capital significantly and favorably influences both genders' chances of finding employment.

R. Khan and Chaudhry (2019) investigate the effect of HC on employment in developing countries by utilizing the data from World Bank and World Development Indicators (WDI) for the time period of 1996 to 2018 and found that these variables (life expectancy and educational expenditures) measured human capital are determined to be substantial and so contribute to growth and employment possibilities in emerging countries.

Economic Growth and Human Capital

A rise in the output of economic commodities, and services is referred to as economic growth. To evaluate overall economic growth, GNP and GDP are typically utilized. In its purest form, economic growth is a rise in an economy's overall output. In simple words, the working-age population's size or quality, the resources at their disposal, and the strategies chosen to combine manpower, equipment, and materials will all increase economic output. Because investment increases productivity, human capital, and economic growth are positively correlated. Training a workforce means making an investment, but it's a human capital investment rather than a capital investment like equipment.

Mostly researchers investigate the impact of HC on economic growth like “Pelinescu (2015), Mincer (1984), Galor and Tsiddon (1997), and Freire-Serén (1999)” However, Feriyanto (2016) conducted a study to investigate the impact of economic growth, employment and investment on HDI of thirty-three provinces, in the country of Indonesia by utilizing the data from Central Bureau of Statistics (BPS), Indonesia for 2006 to 2013 time period. The study's findings suggest that economic growth rate does not affect HDI in Indonesia.

Technology, Wages, and Human Capital

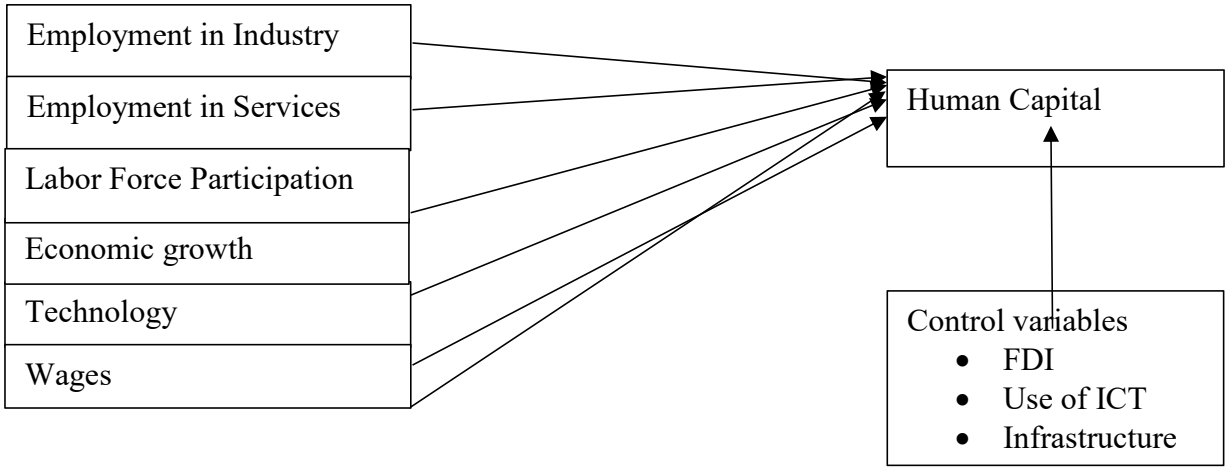
Kim and Lee (2011) conducted research on “the structure of HC,

technological growth, and numerous development avenues". To investigate how changes in technology affect the rates of income and human capital growth in unsteady technological contexts is the goal of this study. The study's findings suggest that the development of human capital may be adversely affected by emerging technologies with more ambiguous properties.

A study on "Wages, productivity and HC in the European Union" is conducted by Guisan and Aguayo (2007). In this study, five EU nations, namely United Kingdom, Spain, France, Italy and Germany are examined to determine how wages, productivity, and human capital are related. Study used data from OECD statistics for the 1985-2005 period of time. The study's main findings suggest that the European Union should create economic policies to enhance human capital.

Conclusively, the above-discussed literature review indicates that less research work has been done to investigate the effect of all these explanatory variables namely employment, economic growth, technology, and wages on human capital.

2.8 Conceptual Framework _



DATA AND METHODOLOGY

Variables and Source of Data

This study intends employment, economic growth, technology, and wages as the independent variables while human capital as the dependent variable. Furthermore, FDI, ICT, and infrastructure are used as control variables. Time series data is utilized for the time period of 1990 to 2020. Whereas, the data of all variables are collected from WDI (World Development Indicators).

Methodology

Vector error correction model (VECM) is also referred to as structural vector auto regression (SVAR), it takes into account both immediate and delayed linkages between variables of interest to provide more reliable multivariable time series analysis results.

Model Specification

To investigate the short and long-run relationships among the modeled variables, VECM (vector error correction model) is utilized.

The equation of error correction term (ECT) is described as follows:

$\Delta y_t = \propto \varepsilon_{t-1} + \gamma \Delta x_t + \mu_t$

Where $\propto$ explains the co-integrating coefficient and the error term is represented by ε from the regression of y_t o n x_t. And the VECM equation is described as follows:

$$\Delta y = \delta + \beta 0 \Delta X_t - \Pi \cup_{t-1} + \in_t$$

The short-term influence of independent factors on the dependent variable is measured as $\beta 0$. Π symbol presents the ECT which explains how much time it will take to adjust back to equilibrium in the case of an external shock that causes the model to diverge from equilibrium. VECM is the extended form of using a single equation of ECM in a multivariate system Lütkepohl (2007). A general autoregressive process helps to find the VAR model in vector form. The VAR model with lag order is described as follows:

$y_t = c + A_i y_{t-1} + A_2 y_{t-2} + \ldots\ldots + A_p y_{t-p} + e_i$

Where c represents the vector of constants, coefficient matrices signify for lagged values, and symbolizes the vector of error terms. If variables are integrated at level, then VAR is not a suitable method because it will generate no sense of relationships among the variables. Series need to be integrated at the first difference for reliable results. A co-integration test is applied to evaluate the long-run relation between the variables, whereas the VAR test helps to find the short-run relation between the modeled variables.

The VAR model: $y_t = c + \sum_{i=1}^{p} A_i y_{t-1} + e_t$ can be written as a VECM model:

$\Delta y_t = v + \pi y_{t-1} + \sum_{i=1}^{p} \Gamma_i y_{t-i} + e_t$

Where $= \sum_{j=1}^{j=1} A_i - I_k$ and $\Gamma_i \sum_{j=1-1}^{j=1} A_j$

= k ( ) represents the co-integrating relations that are linearly independent of each other. For the appropriate result value of (coefficient of determination), should lie between 0 and 1. If = 0, then it means that variables do not have a long-term relationship and there is no co-integration; so, we cannot apply the VAR model. If = 1, then it means co-integration exists among the variables and VECM is appropriate. If the study presents co-integration among the variables, then it can be stated in the subsequent equation:

$$\Delta y_t = \alpha\left(\beta' y_{t-1} + \mu + pt\right) + \sum_{i=1}^{p} \Gamma_i \Delta y_{t-1} + \gamma + \gamma t + e_t$$

Econometric Model

Human capital is the dependent variable; so, to measure human capital five measurements are used in this study namely, primary enrollment, secondary enrollment, tertiary enrollment, life expectancy at birth, and child mortality. Furthermore, this study used four independent variables namely, employment,

economic growth, technology, and wages as well as three control variables FDI, use of ICT, and infrastructure are used in this study. The data of all the variables are collected from World Development Indicators (WDI).

General Model

Model 1

$$SEP = \infty_1 + \beta_1 EIND + \beta_2 ES + \beta_3 LFPT + \beta_4 GDP + \beta_5 Wages + \beta_6 TECH + \beta_7 ATE + \beta_8 MCS + \beta_9 FDI + \mu$$

Model 2

$$SES = \infty_1 + \beta_1 EIND + \beta_2 ES + \beta_3 LFPT + \beta_4 GDP + \beta_5 Wages + \beta_6 TECH + \beta_7 ATE + \beta_8 MCS + \beta_9 FDI + \mu$$

Model 3

$$SET = \infty_1 + \beta_1 EIND + \beta_2 ES + \beta_3 LFPT + \beta_4 GDP + \beta_5 Wages + \beta_6 TECH + \beta_7 ATE + \beta_8 MCS + \beta_9 FDI + \mu$$

Model 4

$$LEB = \infty_1 + \beta_1 EIND + \beta_2 ES + \beta_3 LFPT + \beta_4 GDP + \beta_5 Wages + \beta_6 TECH + \beta_7 ATE + \beta_8 MCS + \beta_9 FDI + \mu$$

Model 5

$$CM = \infty_1 + \beta_1 EIND + \beta_2 ES + \beta_3 LFPT + \beta_4 GDP + \beta_5 Wages + \beta_6 TECH + \beta_7 ATE + \beta_8 MCS + \beta_9 FDI + \mu$$

Empirical Results

Co-Integration Test

The long-run relationship or cointegration of the series has been investigated by utilizing the Johansen cointegration test. The results of the Johansen cointegration test reported in Table 1.

In model 1, trace statistic and maximum eigen statistic results show that six co-integrating equations exist in the VAR system. The results of model 2, suggest that there are five co-integrating equations. Moreover, the trace statistic and maximum eigen statistic of model 3, indicate that there are four cointegrating equations. While model 4, results tell seven cointegrating equations in the VAR system. Results of model 5, indicate five cointegration equations and this implies that a long-run association exists between variables. In other words, they move together in the long-run also this reveals that the null hypothesis is rejected at a 5% level of significance and accepts the alternative that there is a cointegration or a long-term relationship exists.

Table 1 Co-Integration Results

Model 1				
Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.500000	228.1568	125.6154	0.0000
At most 1 *	0.500000	177.5571	95.75366	0.0000
At most 2 *	0.494329	126.9573	69.81889	0.0000

At most 3 *	0.401688	77.18086	47.85613	0.0000
At most 4 *	0.277538	39.68493	29.79707	0.0027
At most 5 *	0.185649	15.95337	15.49471	0.0426
At most 6	0.013090	0.961849	3.841466	0.3267
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.500000	50.59974	46.23142	0.0160
At most 1 *	0.500000	50.59974	40.07757	0.0023
At most 2 *	0.494329	49.77647	33.87687	0.0003
At most 3 *	0.401688	37.49593	27.58434	0.0019
At most 4 *	0.277538	23.73156	21.13162	0.0210
At most 5 *	0.185649	14.99152	14.26460	0.0383
At most 6	0.013090	0.961849	3.841466	0.3267
Model 2				
Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.500000	165.1648	95.75366	0.0000
At most 1 *	0.500000	122.8828	69.81889	0.0000
At most 2 *	0.381001	80.60084	47.85613	0.0000
At most 3 *	0.358592	51.34209	29.79707	0.0001
At most 4 *	0.326168	24.25267	15.49471	0.0019
At most 5	0.002806	0.171434	3.841466	0.6788
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.500000	42.28198	40.07757	0.0278
At most 1 *	0.500000	42.28198	33.87687	0.0040
At most 2 *	0.381001	29.25874	27.58434	0.0302
At most 3 *	0.358592	27.08943	21.13162	0.0064
At most 4 *	0.326168	24.08123	14.26460	0.0011
At most 5	0.002806	0.171434	3.841466	0.6788
Model 3				
Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.502613	230.5238	125.6154	0.0000
At most 1 *	0.488925	173.9545	95.75366	0.0000
At most 2 *	0.464917	119.5841	69.81889	0.0000
At most 3 *	0.391720	68.93207	47.85613	0.0002
At most 4	0.194315	28.66533	29.79707	0.0671

At most 5	0.088424	11.16424	15.49471	0.2016
At most 6	0.044241	3.665239	3.841466	0.0556
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.502613	56.56929	46.23142	0.0029
At most 1 *	0.488925	54.37043	40.07757	0.0007
At most 2 *	0.464917	50.65200	33.87687	0.0002
At most 3 *	0.391720	40.26674	27.58434	0.0007
At most 4	0.194315	17.50108	21.13162	0.1496
At most 5	0.088424	7.499003	14.26460	0.4319
At most 6	0.044241	3.665239	3.841466	0.0556
Model 4				
Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.500000	255.3262	125.6154	0.0000
At most 1 *	0.495671	201.9539	95.75366	0.0000
At most 2 *	0.445497	149.2454	69.81889	0.0000
At most 3 *	0.398618	103.8398	47.85613	0.0000
At most 4 *	0.325607	64.68339	29.79707	0.0000
At most 5 *	0.253983	34.34987	15.49471	0.0000
At most 6 *	0.141953	11.78839	3.841466	0.0006
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.500000	53.37233	46.23142	0.0074
At most 1 *	0.495671	52.70851	40.07757	0.0012
At most 2 *	0.445497	45.40562	33.87687	0.0014
At most 3 *	0.398618	39.15636	27.58434	0.0011
At most 4 *	0.325607	30.33352	21.13162	0.0019
At most 5 *	0.253983	22.56149	14.26460	0.0020
At most 6 *	0.141953	11.78839	3.841466	0.0006
Model 5				
Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.500000	220.8956	125.6154	0.0000
At most 1 *	0.485556	167.5233	95.75366	0.0000
At most 2 *	0.442985	116.3437	69.81889	0.0000
At most 3 *	0.354182	71.28622	47.85613	0.0001
At most 4 *	0.275289	37.61893	29.79707	0.0051

At most 5	0.135783	12.82632	15.49471	0.1213
At most 6	0.020433	1.589602	3.841466	0.2074
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.500000	53.37233	46.23142	0.0074
At most 1 *	0.485556	51.17954	40.07757	0.0019
At most 2 *	0.442985	45.05750	33.87687	0.0016
At most 3 *	0.354182	33.66729	27.58434	0.0073
At most 4 *	0.275289	24.79261	21.13162	0.0146
At most 5	0.135783	11.23672	14.26460	0.1427
At most 6	0.020433	1.589602	3.841466	0.2074

Vector Error Correction

VECM is used in this study to investigate the short-run and long-run estimates and long-run results for models 1,2,3,4 and 5 are reported in table 2.

Table 2 Vector Error Correction Estimates

Model 1 (Dep. Var. = SEP)			
Variables	**β**	**Standard Errors**	**T-statistics**
EIND (-1)	6.502123*	(1.85693)	[3.50154]
ES (-1)	7.523214*	(2.72022)	[2.76566]
LFPT (-1)	4.144234*	(1.99458)	[2.07774]
GDP (-1)	5.371088*	(0.60831)	[8.82952]
TECH (-1)	3.884597*	(1.00086)	[3.88125]
W (-1)	2.471041*	(0.77742)	[3.17852]
FDI (-1)	7.961237*	(1.85213)	[4.29842]
MCS (-1)	1.77E-07*	(5.8E-08)	[3.04004]
ATE (-1)	12.22535*	(6.06871)	[2.01449]
Model 2 (Dep. Var. = SES)			
Variables	**β**	**Standard Errors**	**T-statistics**
EIND (-1)	2.499065*	(0.33255)	[7.51485]
ES (-1)	12.70068*	(6.17982)	[2.05519]
LFPT (-1)	16.04012*	(6.17162)	[2.59901]

GDP (-1)	6.851765*	(2.07205)	[3.30675]
TECH (-1)	93.43393*	(10.1782)	[9.17980]
W (-1)	8.544480*	(2.12510)	[4.02074]
FDI (-1)	9.285830*	(2.95903)	[3.13813]
MCS (-1)	1.16E-07**	(1.6E-07)	[0.70847]
ATE (-1)	23.73147*	(10.1526)	[2.33747]
Model 3 (Dep. Var. = SET)			
Variables	**β**	**Standard Errors**	**T-statistics**
EIND (-1)	4.962670*	(2.17580)	[2.28084]
ES (-1)	10.03115*	(2.83679)	[3.53609]
LFPT (-1)	11.40192*	(2.37412)	[4.80259]
GDP (-1)	4.654826*	(0.69426)	[6.70473]
TECH (-1)	6.615608*	(0.5838)	[11.3319]
W (-1)	4.458756*	(0.94983)	[4.69428]
FDI (-1)	7.345734*	(2.13486)	[3.44085]
MCS (-1)	1.93E-07*	(6.9E-08)	[2.80051]
ATE (-1)	13.99889*	(6.58197)	[2.12685]
Model 4 (Dep. Var. = LEB)			
Variables	**β**	**Standard Errors**	**T-statistics**
EIND (-1)	0.651785*	(0.37952)	[5.95128]
ES (-1)	0.498179*	(0.10777)	[4.62261]
LFPT (-1)	0.901867*	(0.40299)	[2.23793]
GDP (-1)	0.456920*	(0.12121)	[3.76965]
TECH (-1)	9.780524*	(3.59097)	[2.72364]
W (-1)	0.580494*	(0.16263)	[3.56941]
FDI (-1)	0.960753*	(0.37228)	[2.58072]
MCS (-1)	8.033121*	(1.21433)	[6.61527]
ATE (-1)	4.020049*	(1.14081)	[3.52385]

Model 5 (Dep. Var. = CM)			
Variables	**β**	**Standard Errors**	**T-statistics**
EIND (-1)	-5.863714*	(2.72707)	[-2.15019]
ES (-1)	-9.980581*	(3.57530)	[-2.79153]
LFPT (-1)	-9.079464*	(2.89262)	[-3.13883]
GDP (-1)	-0.392388*	(0.17002)	[-2.30789]
TECH (-1)	-18.74258*	(8.77177)	[-2.13669]
W (-1)	-8.661316*	(1.16624)	[-7.42670]
FDI (-1)	5.390332*	(2.67385)	[2.01594]
MCS (-1)	7.59E-09**	(8.5E-08)	[0.08925]
ATE (-1)	-9.597273*	(2.20415)	[-4.35418]

* Shows significance ** shows insignificance.

Model 1

The findings show that employment in the industry has a positive and significant long-run association with primary enrollment (β=6.502*); The value of the coefficient indicate that a one unit increase in employment in the industry leads to a 6.50 unit increase in primary enrollment.

Employment in services has a positive and significant long-run association with primary enrollment (β=7.523*); The value of the coefficient indicate that one unit increase in employment in services leads to a 7.52 unit increase in primary enrollment.

Labor force total participation has a positive and significant long-run association with primary enrollment (β=4.144*); The value of the coefficient indicate that one unit increase in labor force total participation leads to a 4.14 unit increase in primary enrollment.

In the long run, GDP is significantly and favorably correlated with primary enrollment (β=5.371*); according to the coefficient's value, an increase in GDP results in a 5.37 unit increase in primary enrollment.

Technology is positively and significantly correlated with primary enrollment in the long-run (β=3.884*); according to the coefficient's value, an increase in technology results in a 3.88 unit increase in primary enrollment.

Wages has a positive and significant long-run association with primary enrollment (β=2.471*); according to the coefficient's value, an increase in wages results in a 2.47 unit increase in primary enrollment.

Foreign direct investment (FDI) has a positive and significant long-run association with primary enrollment (β=7.961*); The value of the coefficient indicate

that one unit increase in FDI leads to a 7.96 unit increase in primary enrollment.

Mobile cellular subscription has a positive and significant long-run association with primary enrollment (β=1.77E*); The value of the coefficient indicate that one unit increase in mobile cellular subscription leads to a 1.77 unit increase in primary enrollment.

Access to electricity (ATE) has a positive and significant long-run association with primary enrollment (β=12.225*); The value of the coefficient indicate that one unit increase in access to electricity leads to a 12.22 unit increase in primary enrollment.

Model 2

The results indicate that employment in the industry has a positive and significant long-run association with secondary enrollment (β=2.499*); The value of the coefficient indicate that a one unit increase in employment in the industry leads to a 2.49 unit increase in secondary enrollment.

Employment in services has a positive and significant long-run association with secondary enrollment (β=12.700*); The value of the coefficient indicate that a one unit increase in employment in services leads to a 12.70 unit increase in secondary enrollment.

Labor force total participation has a positive and significant long-run association with secondary enrollment (β=16.040*); The value of the coefficient indicate that one unit increase in labor force total participation leads to a 16.04 unit increase in secondary enrollment.

GDP has a positive and significant long-run association with secondary enrollment (β=6.851*); according to the coefficient's value, an increase in GDP results in a 6.85 unit increase in secondary enrollment.

Technology has a positive and significant long-run association with secondary enrollment (β=93.433*); The value of the coefficient indicates that increase in technology results in a 93.43 unit increase in secondary enrollment.

Wages has a positive and significant long-run association with secondary enrollment (β=8.544*); The value of the coefficient shows that an increase in wages causes secondary enrollment to rise by 8.54 units.

Foreign direct investment (FDI) has a positive and significant long-run association with secondary enrollment (β=9.285*); The value of the coefficient indicates that an increase in foreign direct investment results in a 9.28 unit increase in secondary enrollment.

Mobile cellular subscription has a positive but insignificant long-run association with secondary enrollment (β=1.16E**); The value of the coefficient indicate that one unit increase in mobile cellular subscription leads to a 1.16 unit increase in secondary enrollment.

Access to electricity (ATE) has a positive and significant long-run association with secondary enrollment (β=23.731*); The value of the coefficient indicate that one unit increase in access to electricity leads to a 23.73 unit increase in secondary enrollment.

Model 3

The results indicate that employment in the industry has a positive and significant long-run association with tertiary enrollment (β=4.962*); The value of the coefficient indicate that one unit increase in employment in the industry leads to a 4.96 unit increase in tertiary enrollment.

Employment in services has a positive and significant long-run association with tertiary enrollment (β=10.031*); The value of the coefficient indicate that one unit increase in employment in services leads to a 10.03 unit increase in tertiary enrollment.

Labor force total participation has a positive and significant long-run association with tertiary enrollment (β=11.401*); The value of the coefficient indicate that one unit increase in labor force total participation leads to 11.40 unit increase in tertiary enrollment.

GDP has a positive and significant long-run association with tertiary enrollment (β=4.654*); according to the coefficient's value, an increase in GDP results in a 4.65 unit increase in tertiary enrollment.

Technology is positively and significantly correlated with tertiary enrollment over time (β=6.615*); The value of the coefficient indicates that an increase in technology results in a 6.61 unit increase in tertiary enrollment.

Wages has a positive and significant long-run association with tertiary enrollment (β=4.458*); The value of the coefficient indicate that an increase in wages results in a 4.45 unit increase in tertiary enrollment.

Foreign direct investment (FDI) has a positive and significant long-run association with tertiary enrollment (β=7.345*); according to the coefficient's value, an increase in foreign direct investment results in a 7.34 unit increase in tertiary enrollment.

Mobile cellular subscription has a positive and significant long-run association with tertiary enrollment (β=1.93E*); The value of the coefficient indicate that one unit increase in mobile cellular subscription leads to a 1.93 unit increase in tertiary enrollment.

Access to electricity (ATE) has a positive and significant long-run association with tertiary enrollment (β=13.998*); The value of the coefficient indicate that one unit increase in access to electricity leads to a 13.99 unit increase in tertiary enrollment.

Model 4

The results indicate that employment in the industry has a positive and significant long-run association with life expectancy at birth (LEB), (β=0.651*); The value of the coefficient indicate that one unit increase in employment in the industry leads to a 0.65 unit increase in life expectancy at birth (LEB).

Employment in services is positively and significantly correlated with life expectancy at birth (LEB), (β=0.498*); The value of the coefficient indicate that one unit increase in employment in services leads to a 0.49 unit increase in life expectancy at birth (LEB).

Labor force total participation has a positive and significant long-run association with life expectancy at birth (β=0.901*); The value of the coefficient indicate that one unit increase in labor force total participation leads to a 0.90 unit increase in (LEB).

GDP is positively and significantly correlated with life expectancy at birth (LEB), (β=0.456*); according to the coefficient's value, an increase in GDP results in a 0.45 unit increase in life expectancy at birth.

Technology is positively and significantly correlated with life expectancy at birth (LEB), (β=9.780*); according to the coefficient's value, an increase in technology results in a 9.78 unit increase in life expectancy at birth (LEB).

Wages are positively and significantly correlated with life expectancy at birth over time (β=0.580*); The value of the coefficient indicate that an increase in wages results in a 0.58 unit increase in LEB.

Foreign direct investment (FDI) is positively and significantly correlated with life expectancy at birth (LEB), (β=0.960*); according to the coefficient's value, an increase in FDI results in a 0.96 unit increase in life expectancy at birth (LEB).

Mobile cellular subscription has a positive and significant long-run association with life expectancy at birth (β=8.033*); The value of the coefficient indicate that one unit increase in mobile cellular subscription leads to an 8.03 unit increase in life expectancy at birth (LEB).

Access to electricity is positively correlated or has a long-run association with life expectancy at birth (β=4.020*); The value of the coefficient indicate that one unit increase in access to electricity leads to a 4.02 unit increase in life expectancy at birth (LEB).

Model 5

Results of model 5 indicate that employment in the industry has a negative and significant long-run association with child mortality (β=-5.863*); The value of the coefficient indicate that one unit increase in employment in the industry leads to a -5.86 unit decrease in child mortality.

Employment in services has a negative and significant long-run association with child mortality (β=-9.980*); The value of the coefficient indicate that one unit increase in employment in services leads to a -9.98 unit decrease in child mortality.

Labor force total participation has a negative and significant long-run association with child mortality (β=-9.079*); The value of the coefficient indicate that one unit increase in labor force total participation leads to a -9.07 unit decrease in child mortality.

GDP has a negative and significant long-run association with child mortality (β=-0.392*); The value of the coefficient indicates that an increase in GDP results in a -0.39 unit decrease in child mortality.

Technology has a negative association with child mortality in the long run (β=-18.742**); The value of the coefficient indicates that increase in technology results in a -18.74 unit decrease in child mortality.

Wages has a negative and significant long-run association with child

mortality (β=-8.661*); The value of the coefficient indicate that one unit increase in wages leads to a -8.66 unit decrease in child mortality.

Foreign direct investment (FDI) has a positive and significant long-run association with child mortality (β=5.390*); The value of the coefficient indicate that one unit increase in FDI leads to a 5.39 unit increase in child mortality.

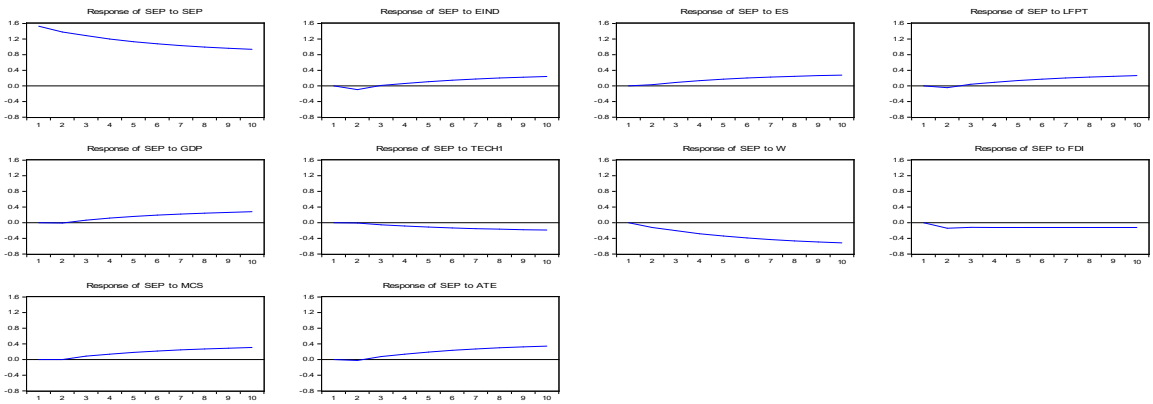
Mobile cellular subscription has a positive but insignificant long-run association with child mortality (β=7.59E**); The value of the coefficient indicate that one unit increase in mobile cellular subscription leads to a 7.59 unit increase in child mortality.

Access to electricity has a negative and significant long-run association with child mortality (β=-9.597*); The value of the coefficient indicate that one unit increase in access to electricity leads to a -9.59 unit decrease in child mortality.

Impulse Response Function

In practical research, the impulse response function improves the credibility of VAR econometrics. Impulse response converts the whole representation of the VAR system into a moving average (Hamilton, 1990). Figure 1, 2, 3, 4, and 5 shows the findings of generalized impulse responses for VECM for a predicted timeframe of 10 quarters.

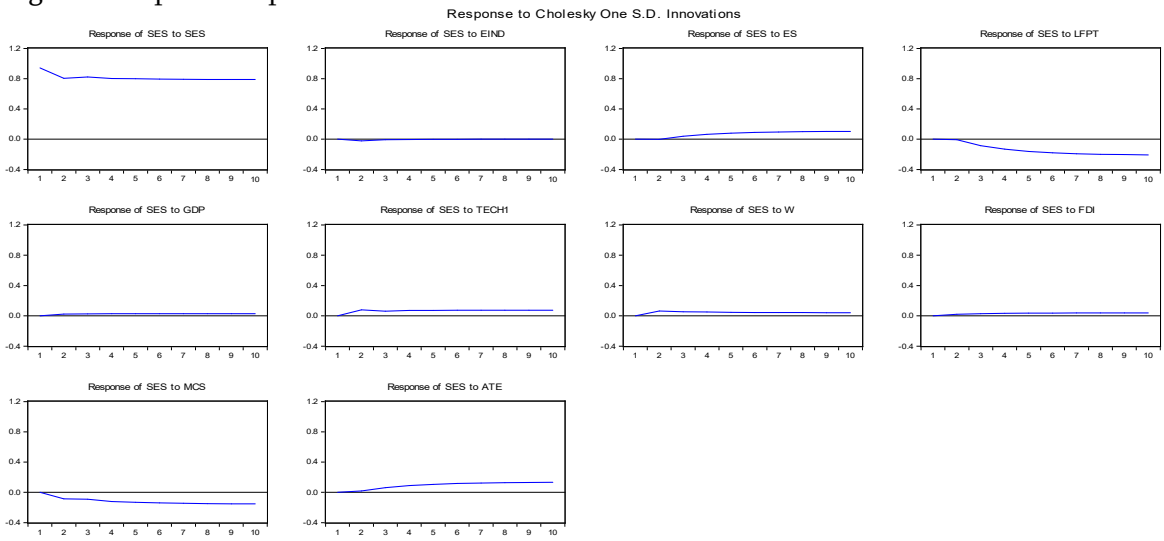
Figure 1. Impulse Response Functions for Model 1



The findings suggest that one standard positive shock to SEP will have a positive impact on SEP in all of the anticipated ten quarters. Similarly, one standard positive shock to EIND will initially have a negative impact on SEP in quarter two, but will then have a positive impact on SEP for the next eight quarters. Furthermore, one standard positive shock to ES will have a positive impact on SEP for the next ten quarters. One standard positive shock to LFPT will initially have a negative impact on SEP in quarter two, but will then have a positive impact on SEP for the next eight quarters. Similarly, a standard positive shock to GDP will initially have a negative impact on SEP in quarter two, but will thereafter have a positive impact on SEP for the next eight quarters. One standard positive shock to TECH, on the other hand, effects SEP positively for one quarter and negatively for the next nine quarters. While one standard positive shock to W will initially have a positive impact on SEP

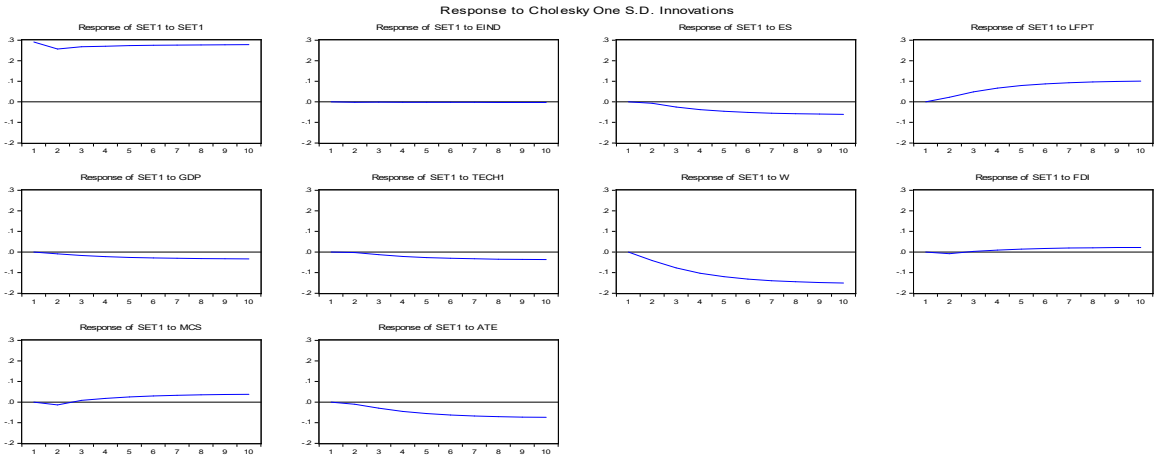
in quarter one, but will then have a negative impact on SEP for the next nine quarters.

Figure 2. Impulse Response Functions for Model 2



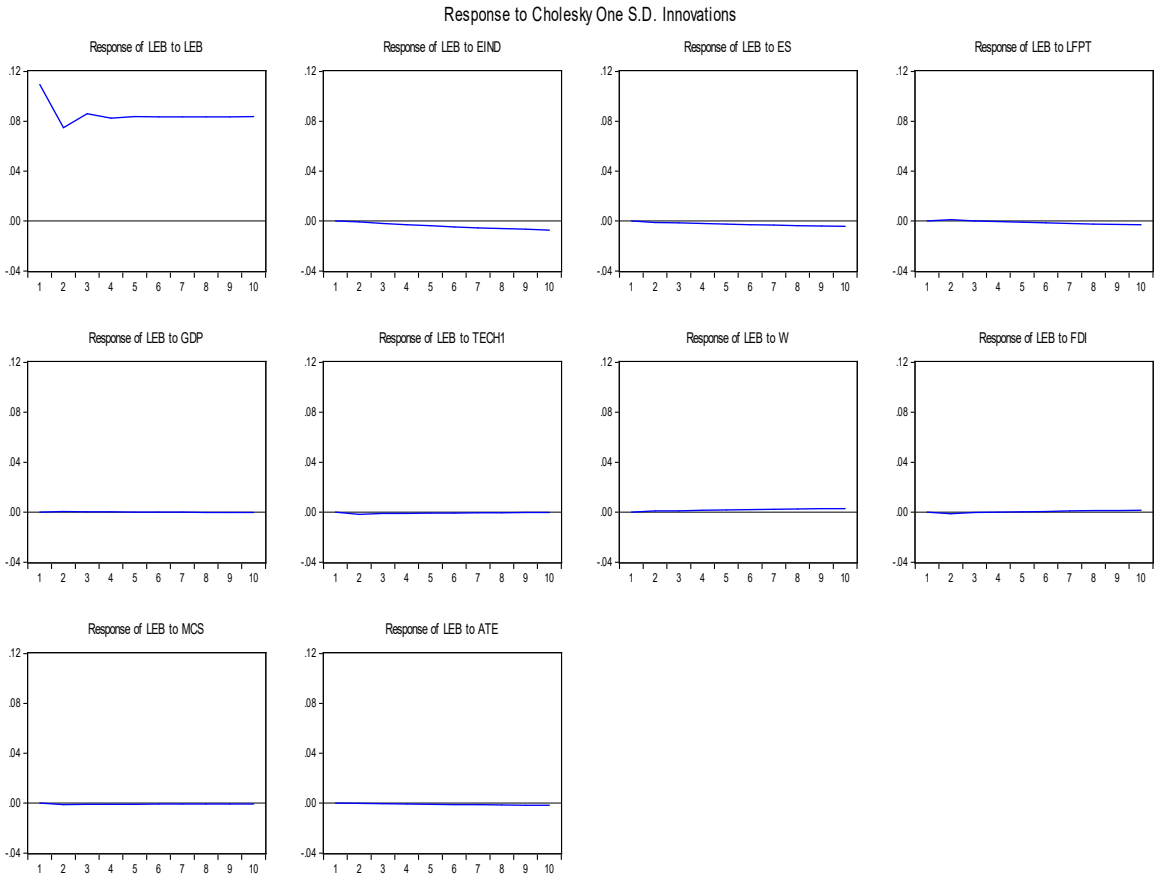
The findings of figure 2 shows that one standard positive shock to SES will have a positive impact on SES in all of the anticipated ten quarters. While one standard positive shock to EIND will initially have a negative impact on SES in two quarters but will then have a positive impact on SES for the next eight quarters. Furthermore, one standard positive shock to ES will have a positive impact on SES for the next ten quarters. One standard positive shock to LFPT will initially have a positive impact on SES in quarter one, but will then have a negative impact on SES for the next nine quarters. On the other hand, one standard positive shock to GDP will initially have a positive impact on SES in all of the predicted ten quarters. Similarly, one standard positive shock to TECH and W has a positive impact on SES in all of the predicted ten quarters.

Figure 3. Impulse Response Functions for Model 3



The results of figure 3 reveal that one standard positive shock to SET will have a positive impact on SET in all of the expected ten quarters and one standard positive shock to EIND will initially have a negative impact on SET in eight quarters but will then have a positive impact on SET for the next two quarters. Furthermore, one standard positive shock to ES will have a positive impact on SET for one quarter and then have a negative impact for the next nine quarters. One standard positive shock to LFPT has a positive impact on SET in all ten quarters. Similarly, one standard positive shock to GDP has a negative influence on SET in all ten quarters. Whereas, one standard positive shock to TECH has a positive impact on SET for the first two quarters and then has a negative impact on SET for the remaining quarters. While one standard positive shock to W will have a negative impact on SET for the next ten quarters.

Figure 4. Impulse Response Functions for Model 4



The results of figure 4 demonstrate that one standard positive shock to LEB will have a positive impact on LEB in all of the expected ten quarters and one standard positive shock to EIND will initially have a positive impact on LEB in only one quarter and then have a negative impact on LEB for the next all quarters. Similarly, one standard positive shock to ES will initially have a positive impact on LEB in one quarter and then have a negative impact on LEB for the next quarters. Furthermore, one standard positive shock to LFPT will have a positive impact on LEB for two quarters

and then have a negative impact for the next quarters. One standard positive shock to GDP has a positive impact on LEB in five quarters and then has a negative impact on LEB for the next five quarters. Likewise, one standard positive shock to TECH has a positive impact on LEB in one quarter only and then negatively affected LEB in all next quarters. Moreover, one standard positive shock to W has a positive impact on LEB for all ten quarters.

Figure 5. Impulse Response Functions for Model 5

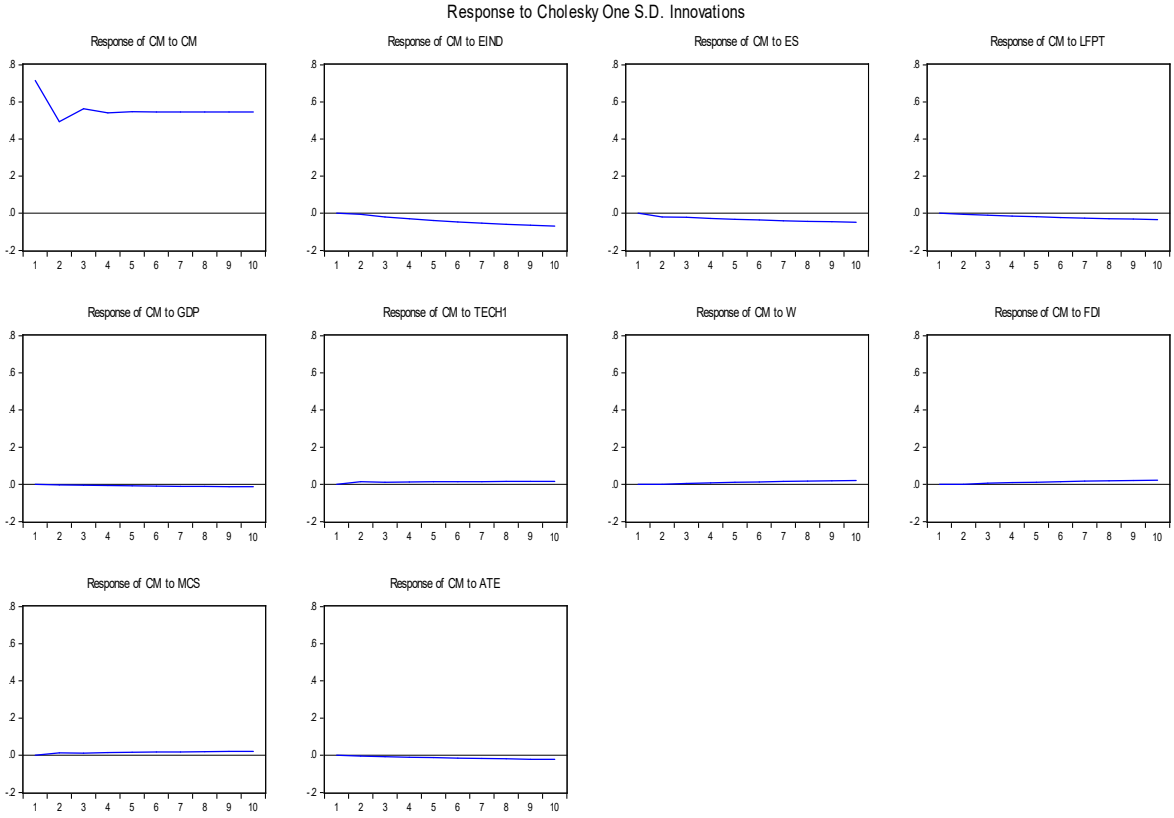


Figure 5 result indicates that one standard positive shock to EIND will initially have a positive impact on CM in two quarters, but will then have a negative impact on CM for the next eight quarters. While one standard positive shock to ES will have a positive impact on CM for one quarter and then have a negative impact for the next quarters. The results are the same for LFPT that one standard positive shock to LFPT will initially have a positive impact on CM in quarter one, but will then have a negative impact on CM for the next ten quarters. Also, one standard positive shock to GDP will initially have a positive impact on CM in quarter one, but will thereafter have a negative impact on CM for the next nine quarters. One standard positive shock to TECH, on the other hand, effects CM positively for all ten quarters. Similarly, one standard positive shock to W will also have a positive impact on CM in all of the predicted quarters.

Variance Decomposition

The amount of innovation that each variable in the VAR system contributes to the other variables is determined through variation decomposition. This study

also establishes the extent to which the external shocks to all other variables can account for the variance in forecast error.

Table 3 Variance Decomposition Results

Model 1										
Period	S.E.	SEP	EIND	ES	LFPT	GDP	TECH	W	FDI	MCS	ATE
1	1.537	100.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	2.087	90.966	1.193	2.037	2.033	1.004	1.019	1.358	0.405	0.001	0.011
3	2.486	83.778	2.145	3.178	3.052	2.053	2.023	1.021	1.517	1.088	0.140
4	2.813	80.845	2.195	3.389	3.146	2.173	2.076	2.935	1.597	1.226	1.413
5	3.101	80.413	3.342	3.638	0.301	1.337	2.151	2.954	2.654	2.417	1.788
6	3.366	79.737	3.551	3.903	3.493	1.525	0.239	3.006	0.697	2.631	2.214
7	3.615	75.005	3.795	4.167	3.702	2.723	2.332	3.034	2.729	0.852	2.657
8	3.851	73.339	4.053	4.421	3.914	2.918	3.424	3.008	2.754	1.069	2.095
9	4.076	71.811	4.312	5.658	4.121	2.105	0.513	4.911	2.773	2.276	2.514
10	4.293	70.457	5.561	5.877	4.318	2.281	3.597	4.738	0.789	0.469	2.906
Model 2											
Period	S.E.	SES	EIND	ES	LFPT	GDP	TECH	W	FDI	MCS	ATE

1	0.946	100.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	1.257	90.777	2.151	2.011	2.021	1.051	1.354	0.223	0.059	0.407	0.076
3	1.516	83.097	3.299	2.023	3.174	1.048	3.289	1.355	0.153	1.538	1.062
4	1.732	85.152	3.497	2.061	3.445	1.096	3.243	0.462	0.251	0.742	0.132
5	1.926	80.273	3.672	3.110	3.739	1.017	3.202	1.540	1.336	1.905	1.202
6	2.102	80.502	4.822	3.156	3.045	0.024	3.173	1.601	1.407	1.044	1.262
7	2.265	75.859	4.945	4.197	3.232	2.031	4.150	1.648	1.465	1.156	2.313
8	2.418	73.326	5.046	4.232	4.422	0.037	4.133	2.685	2.512	2.247	2.355
9	2.561	71.885	6.129	4.262	4.581	0.042	4.119	2.715	2.550	2.322	2.389
10	2.697	70.519	6.198	5.286	4.713	0.046	4.108	2.740	0.582	2.384	2.418
Model 3											
Period	S.E.	SET	EIND	ES	LFPT	GDP	TECH	W	FDI	MCS	ATE
1	0.290	100.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.391	95.237	1.004	1.035	0.321	0.052	0.003	2.110	0.040	0.124	0.068
3	0.48	90.45	2.03	2.29	1.220	0.150	1.076	3.240	0.029	0.11	0.41

	4	2	5	6						3	5
4	0.572	80.950	3.041	3.645	1.239	0.259	2.195	5.547	1.048	1.177	0.930
5	0.656	79.823	3.044	3.982	1.158	1.357	2.317	7.560	0.083	0.283	0.429
6	0.735	80.336	3.047	4.274	2.926	0.438	2.425	5.215	0.120	0.391	0.866
7	0.810	75.482	4.049	4.517	2.550	0.504	2.517	9.546	0.155	0.489	0.230
8	0.880	70.166	4.051	4.716	3.054	0.557	3.593	11.615	0.186	0.575	1.529
9	0.947	63.281	5.052	5.879	5.463	0.600	3.655	14.477	0.212	0.647	0.775
10	1.010	60.738	6.054	5.013	5.797	1.635	3.707	15.179	0.235	0.709	0.977
Model 4											
Period	S.E.	LEB	EIND	ES	LFPT	GDP	TECH	W	FDI	MCS	ATE
1	0.109	100.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.132	80.935	1.003	1.007	1.007	3.001	5.019	2.005	5.009	0.101	1.74E
3	0.158	83.916	1.018	0.013	0.005	3.001	5.016	2.009	5.006	0.104	0.007
4	0.178	80.877	0.042	0.024	0.004	3.001	7.016	3.014	6.005	0.109	0.019
5	0.197	81.828	0.073	0.036	0.006	0.001	9.014	3.019	6.004	0.108	0.036

6	0.214	80.768	0.110	0.049	0.010	0.008	9.013	3.026	7.004	0.106	0.057
7	0.229	70.699	1.150	1.063	1.016	3.0007	11.012	5.032	7.005	0.103	0.080
8	0.244	75.625	0.194	0.077	0.023	3.0007	10.011	6.039	7.007	0.100	0.106
9	0.258	62.545	2.239	2.093	2.032	3.0007	11.010	6.045	9.009	1.096	1.132
10	0.272	60.463	3.286	1.108	2.041	5.0008	12.092	7.052	9.011	0.093	0.160
Model 5											
Period	S.E.	CM	EIND	ES	LFPT	GDP	TECH	W	FDI	MCS	ATE
1	0.715	100.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.869	91.882	1.005	1.054	1.004	2.001	0.027	2.97E	1.0001	0.023	0.001
3	1.036	82.794	3.040	2.079	2.012	3.002	1.031	2.002	3.003	1.027	1.006
4	1.169	80.651	3.094	3.120	2.026	4.004	1.038	2.006	3.008	1.036	1.013
5	1.292	83.488	3.165	3.160	2.043	4.006	0.042	2.012	3.015	0.044	0.021
6	1.404	65.302	4.248	3.203	3.0631	7.009	1.046	4.019	10.023	1.051	1.030
7	1.509	62.104	4.340	4.247	3.084	9.013	1.049	4.027	13.033	0.059	0.039
8	1.60	60.89	6.43	4.29	4.106	9.016	2.053	0.036	14.04	0.06	0.05

	7	8	7	0					3	6	0
9	1.700	64.689	5.536	3.333	4.129	9.020	0.056	0.046	14.053	0.073	0.060
10	1.788	60.479	7.637	5.375	3.152	10.023	0.058	3.055	12.063	0.080	0.070

Table 3 displays the calculated variance decomposition findings. The major oscillation in SEP is clearly produced by the SEP itself. The variability in primary enrollment in recent years appears to have built pressure for it to increase, as illustrated in model 1. Likewise, in the short run, SEP contributes in SEP 100% while in the long run, its contribution decreases to 70%. Furthermore, EIND, ES, LFPT, GDP, TECH, and W have no contribution in SEP in the short run, while their contribution increases up to 5.561%, 5.877%, 4.318%, 2.281%, 3.597%, and 4.738% in the long run respectively.

The results of Model 2, suggest that contribution of SES in SES fall from 100% to 70% in the long run. Moreover, EIND, ES, LFPT, GDP, TECH, and W contributions, on the other hand, increases from zero to 6.198%, 5.286%, 4.713%, .046%, 4.108%, and 2.740 % in the long run respectively.

Similarly, in model 3, practically 100% of the variation in SET is driven by itself, whereas in the long run, its own contribution declines to 60%. The contribution of EIND, ES, LFPT, GDP, TECH, and W, in SET, rises from nearly zero to 6.054%, 5.013%, 5.797%, 1.635%, 3.707%, and 15.179% correspondingly in the long-run.

However, model 4 results demonstrate that in the short run, LEB contributes in LEB 100% while in the long run, its contribution decreases to 60%. Furthermore, EIND, ES, LFPT, GDP, TECH, and W have no contribution in LEB in the short run, while their contribution increases up to 3.286%, 1.108%, 2.041%, 5.0008%, 12.092%, and 7.052% in the long run respectively.

Although, the results of model 5 reveal that contribution of CM in CM fall from 100% to 60% in the long run. Moreover, EIND, ES, LFPT, GDP, TECH, and W contributions, on the other hand, increases from zero to 7.637%, 5.375%, 3.152%, 10.023%, .058%, and 3.005 % in the long run respectively.

RESULTS AND DISCUSSION

The study used five models to show the effect of EIND, ES, LFPT, GDP, TECH, and W, on human capital because this study used five measurements namely, SEP, SES, SET, LEB, and CM for human capital. Literature supports that human capital has dimensions, mainly health and skill (Alnoor, 2020; BHUTTO et al., 2021; Goldsmith, Veum, & Darity Jr, 1997; Lise & Postel-Vinay, 2020; Lundborg, Nordin, & Rooth, 2018) and (Alexandru & Maria, 2012). To measure the skill of human

beings, this study used three proxies, SEP, SES, and SET and for health, this study used two measurements namely LEB and CM.

There is positive relationship between employment and human capital

For the employment three proxies are used namely EIND, ES, and LFPT. Results indicate that employment (EIND; ES; LFPT) has a positive and significant impact on human capital in terms of primary, secondary and tertiary enrollment (β=6.502, β=2.499, β=4.962; β=7.523, β=12.700, 10.031; β=4.144, β=16.040, β=4.962); so, increase in employment causes to increase enrollment in primary, secondary and tertiary.

On the other hand, employment (EIND, ES, LFPT) has a positive impact on human capital in term of life expectancy (β=0.651; β=0.498; β=0.901); so, an increase in employment causes to increase in life expectancy. While, employment (EIND, ES, LFPT) has a negative impact on child mortality (β=-5.863; β=-9.980; β=-9.079); so, an increase in employment causes to decrease in child mortality.

There is positive relationship between economic growth and human capital

The findings of this study also show that economic growth has a favorable effect on human capital in terms of primary, secondary, and tertiary enrollment (β=5.371088; β=6.851765; β=4.654826); so, a rise in economic growth causes also a rise in enrollment in primary, secondary and tertiary.

Whereas, economic growth has a positive impact on human capital in term of life expectancy (β=0.456920); so, a rise in economic growth causes also a rise in life expectancy.While, economic growth has a negative impact on child mortality (β=-0.392388); so, a rise in economic growth causes a decrease in child mortality.

There is positive relationship between technology and human capital

Although results further indicate that technology has a positive impact on human capital in terms of primary enrollment, secondary enrollment, and tertiary enrollment, (β=3.884597; β=93.43393; β=6.615608); so, an increase in technology causes to increase enrollment in primary, secondary and tertiary.

While, technology has a positive impact on human capital in term of life expectancy (β=9.780524); so, an increase in technology causes to increase in life expectancy. Technology has a negative and insignificant impact on child mortality (β=-18.74258); so, an increase in technology causes to decrease in child mortality.

There is positive relationship between wages and human capital

Impact of wages on HC is positive in terms of primary, secondary, and tertiary enrollment (β=2.471041, β=8.544480, β=4.458756); so, an increase in wages causes to increase enrollment in primary, secondary, and tertiary.

Similarly, wages have a beneficial effect on HC in term of life expectancy (β=0.580494); so, an increase in wages causes to increase in life expectancy. Conversely, Wages has a negative impact on child mortality (β=-8.661316); so, an increase in wages causes to decrease in child mortality.

CONCLUSION

The study's main objective is to investigate the rate of return on investment

in education for the up gradation of human capital. This study used employment, economic growth, technology, and wages as independent variables while HC as a dependent variable. Furthermore, FDI, ICT, and infrastructure are used as control variables. Time series data is utilized for the time period of 1990 to 2020. Whereas, the data of all variables are collected from WDI (World Development Indicators). Vector Error Correction Model is used to examine the short-run and long-run relationships among the modeled variables. Results of Model 1, Model 2, and Model 3 indicate that employment in industry, employment in services, labour force participation, economic growth, technology, and wages all have a positive and significant impact on human capital in term of primary, secondary, and tertiary enrollment. Results of Model 4, indicate that employment in industry, employment in services, labour force participation, economic growth, technology, and wages also have a positive and significant impact on human capital (HC) in term of life expectancy at birth. Whereas results of Model 5, indicate that employment in industry, employment in services, labour force participation, economic growth, technology, and wages all negatively affect human capital (HC) in term of child mortality.

Recommendations and Policy Suggestion

The results of this study suggest some recommendations first, wages positively and significantly affect human capital, so this study recommends that government should strictly implement minimum wage laws and the study also suggest that labour unions should play their due role at the time of annual appraisal. Second, Countries with a higher percentage of their people in school and graduating perceive higher economic growth as compared to the countries with a lower percentage of educated workers. As a result, the government must invest in basic and secondary education in order to boost the economy. In this way, education is related to an investment in human capital. Third, Government should introduce policies to promote the industrial and services sector to adjust the workforce and enhance human capital. Fourth, Workers are better able to cope with changes in the market when they are skilled and have easy access to technology to upgrade or add to their talents; so, the government should develop an environment for invention and innovations to promote human capital. Moreover, the government is advised to cut the import of consumption items and should remove taxes on the importation of technology to promote human capital in Pakistan.

Limitations of the Study

This study tried to estimate the effect of training on human capital but due to the unavailability of data, it is unable to estimate the association among training and HC; so, that's why the training variable is dropped out in this study. Furthermore, this study is conducted in Pakistan only; so, researchers can further extend this study to developing and south Asian countries. Another limitation of the study is that this study did not develop the index for human capital; so, in the future researchers can develop indexes and find some results of interest. Moreover, this study has limited focus to a few measurements of return on investment while the researchers can

further deeply investigate the measurements of return on investment as it is a less studied area.

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