



Impact of Human Capital Investment on Economic Growth in Muslim and Non-Muslim Asian Countries

Muhammad Irfan Chani

Department of Management Sciences, COMSATS University Islamabad, Vehari Campus

irfanchani@cuivehari.edu.pk

Muhammad Ramzan Sheikh

Associate Professor of Economics, Bahauddin Zakariya University, Multan

Email: ramzansheikh@bzu.edu.pk

Muhammad Mansha

Department of Management Sciences, COMSATS University Islamabad, Vehari Campus

manshajutt50@gmail.com

Asad Abbas

Department of Management Sciences, COMSATS University Islamabad, Vehari Campus

asad@cuivehari.edu.pk

Javed Iqbal

Department of Economics, The University of Punjab, Lahore

javedeco43@gmail.com

Abstract

This research attempts to examine the long run relationship between human capital investment and economic growth. This study consists of 12 selected Muslims and Non-Muslims countries from SAARC and ASEAN region by taking annual data from 2001 to 2015. The objective of this research is to analyze the influence of human capital investment, physical capital investment on economic growth. To encounter the objective of the study IPS unit root test is applied for determining the stationarity of data and Pedroni cointegration test is applied to observe the existence of cointegration. Fully Modified Ordinary Least Square (FMOLS) econometrics methods have been applied to find the relationship between human capital investment, physical capital investment and economic growth. In this study, the data of all variables have been taken from World Bank Database (WDI). The results of panel FMOLS described that the education expenditure, health expenditure, gross fixed capital formation, labor force and inflation positively linked with economic growth.

Key words: Economic growth, Panel FMOLS, Human capital, Muslims, Non-Muslims, SAARC, ASEAN

Introduction

The connection between human capital investment and economic growth has widely debated. Some literature studies analyzed that the variations in wage differences with labor is the human capital differential that obtained through schooling and healthiness. Spending on human improves the physical and mental health of labors; resultant skilled labor force donates more to the economic growth of country. Sum of knowledge, skills and capabilities that are particular to individuals known as human capital. The theory of human capital proposes that schooling enhances the competence and incomes of persons; thus, education is an asset. However, this asset is not essential for individuals only but it also plays the key role to enhance the productivity



of state. “Spending on human lives is an essential asset” (Marshall, 1920). The importance of human capital investment is that because some level of human skills and knowledge is essential for an institution in order to achieve greater goals. After conducting this study we will be able to recognize which variable is more effective to increase economic development? Researcher emphasizes that the significance of human investment is motivating economic development (Uzawa, 1965). P. M. Romer (1986) highlights that spending on human capital is the central concern influence to monetary growth. Schultz (1961) stated that knowledge is very important for the development process. Human capital theories state that education is an energetic element of economic development. Spending on education and health increases the quality of labor that improves the efficiency of labor force and inspires additional trades and economic development (Chuang & Sollenberger, 2000).

There are two main procedures used for influence of human capital to economic development of country. The firstly is to familiarize human capital as a contribution in the manufacture growth (Uzawa, 1965). The secondly method shadow (Nelson & Phelps, 1966) they deliberate spending on education and health for basis of manufacture development. Meanwhile the standard of human capital defines the volume of an economy to modernize or to appliance prevailing machineries; human capital is associated with the growth rate. (R. J Barro & Lee, 1993) inspected the exploration of human capital and economic development consuming expenditure on education for human capital formation. Firstly human capital effect the interior level of invention as proved by P. M Romer (1990). Secondly human capital effect the level of distribution of knowledge in the essence established by Nelson and Phelps (1966). They demonstrated that rise of 1 percent of the capital accumulation pointers to a 0.13 percent improve in the growth rate and the procedure of infectious development of technology for further nations is intensely affected by human capital accumulation countrywide as established by Funke and Strulik (2000).

Significance of the Study

The importance of human capital investment is that because some level of human skills and knowledge is essential for an institution in order to realize greater goals. Human capital share also has important indirect return or spill-over effects. Such spill-over effects also help to stimulate knowledge, inventions and efficiency which enhance productivity and rate of growth. After conducting this study we will be able to recognize which variable is more effective to upsurge economic progression. Many earlier research inspected the relationship between human capital and economic development using schooling year’s enrollment and find out positively and significant influence on economic growth (Q Abbas and E Mujahid-Mukhtar (2000); (Haldar & Mallik, 2010); (Akpolat, 2014). Past literatures confirm causal relationship differ from nation to nation and there is no unanimous results of all the literatures so its quiet important issue that is why the purpose of this research to determine the link between human capital investment and economic growth in Muslims and Non-Muslims countries from SAARC and ASEAN regions.

Statement of the Problem

The major challenge is the human capital formation diversity in Muslims and Non-Muslims countries. Public policies such as low spending on education and health cause these issues. There is another challenge of shortage of skilled labor and poor health conditions due to underinvestment in education and health in Muslims and Non-Muslims region. Investment in



education, research & development programs, technology discoveries, and female's labor force participation is very low in Muslims countries. The research question of this study is to find nexus among human capital investment and economic growth in Muslims and Non-Muslims countries selected from SARRC and ASEAN countries.

Gap/ Contribution of the Study

In previous research individually country and South Asian countries studies examined to check the relationship between human capital formation and economic development mostly. This research is a unique effort to perceive the influence of human capital investment, physical capital investment on economic growth in Muslims and Non-Muslims countries selected from SAARC and ASEAN countries.

Objective of the Study

The study has following objective

- To determine the influence of human capital investment and physical capital investment on economic growth.

Organization of the Study

The primary section includes the background of study, significance of the study as well as the statement of the problem and objective. The second section thoroughly analyzes the previous literature to support to this study. The third part defines the theoretical literature review and research methodology and the source of the data to be followed in this research. The fourth part contains the research methodology used in this study. The fifth section includes data analysis, results, and interpretation. The final section provides the discussion, conclusion, policy recommendation and limitation of the study.

Literature Review

Pelinescu (2015) observed the specific European Union's countries, the connection between human capital and economic development from 2000-2012. GDP per capita taken as endogenous variable and exogenous variables are education expenditure, exports of goods and services in this study. Researcher applied the pooled least squares model and panel model based on (Hanushek, 2013) approach for econometric analysis. The results of this research indicated that all explanatory variables significant correlation except education expenditure.

R. J Barro (2001) analyzed the connection between human capital investment and economic development. Panel regression estimation consists of 100 selected states. The study covered the data from 1965 to 1995. Three stages least square econometrics technique used for estimation. The results of the research described that government spending has significantly negative influence on growth and remaining variables have positive and significant influence on progress, international openness has also significantly positively influence on growth and inflation shows negative relationship with economic development.

Hanushek (2013) observed the nexus of human capital formation and economic development using the sample of 50 emerging nations. The data set compiled by (Hanushek, 2013) used in this research. The case study of developing states was used for this estimation and data was collected over the period of 1960 to 2000. The author measured the human capital with cognitive skills



and school enrollment and attainment rate in this research. The research finds that optimistic relationship occurs among human capital and economic development.

Awan and Kamran (2017) studied the nexus of human capital investment and economic growth of Pakistan. This research used annually data taken from 1985 to 2014. The Autoregressive Distributive Lag (ARDL) method is used for econometrics estimations. Bound test approach applies to determine the cointegration of the variables and ECM also applied to display the convergence into the equilibrium path. Data of selected variables were extracted from WDI, ECP and SBP. The results of the study indicated that all explanatory variables have positively influence on economic development of Pakistan.

(Adeyemi & Ogunsola, 2016) estimated the association of spending on education and health spending with economic development of Nigeria. The annually data was taken from 1980-2013. Autoregressive Distributive Lag (ARDL) cointegration technique was applied for estimation in this research. Unit root test Phillips-Perron, ARDL bound test and Wald test also used for analysis. The authors find out all independent variables positively influence to economic growth in case of Nigeria country.

Gebrehiwot (2016) assessed the influence of education expenditure and health expenditure on economic development in Ethiopia. The annually data from 1975-2011 is used for estimation. Autoregressive Distributive Lag (ARDL) and ECM were applied for econometrics estimation to explore the influence of human capital development on economic development. The major sources of data collection were National Bank of Ethiopia (NBE) and Ethiopia Economic Association (EEA). The main findings of this research indicate that all explanatory variables have positively and statistically significant influence on economic development.

Omitogun, Osoba, and Tella (2016) checked the influence of human capital variables on economic growth of Nigeria from 1986-2014. The econometrics techniques FMOLS used for the estimation ADF test and Johanson cointegration applied in this research. The findings of the research showed that education expenditure and health expenditure have positively affected the economic development of Nigeria.

Hussain and Zafar (2017) examined the link between government spending and economic development of Pakistan. This study depends on the annually from 1972-2015. Augmented Dickey-Fuller test and granger casualty test applied here and ARDL bound testing approach and ECM techniques used for econometrics analysis. Different data sources were used in this research such as WDI, Pakistan economic survey and SBP. The data of military expenditure was obtained from SIPRI database. The findings of the research revealed that there occurs short run relationship between variables.

M. Ali, Egbetokun, and Memon (2018) inspected the nexus of human capital, social capabilities and economic development using 15 years data from 1996-2011 of 132 countries. The panel data technique Panel ARDL is applied in this research. The results of this research revealed that inclusive results due to omitted variables related to social capabilities and authors also find out that human capital and economic development emphasize both.

Alataş and Çakir (2016) explored the nexus of education expenditure and spending on healthiness with economic development in a panel of 65 nations. This research covered the data span of 1967-2011. The data of selected variables were extracted from WDI. FEM and REM used for estimation of the study. Hausman test also applied for examining which model is more



suitable for estimations. The researchers concluded that investment on healthiness and schooling has positively and statistically significant effect on economic development.

Liao, Du, Wang, and Yu (2019) observed the association between spending on education and sustainable economic development of China. The research follows the data of 21 different towns of China for data span of 2000-2016. The authors applied the fixed effect model on Cobb-Douglas production function for econometric estimation. GDP used as endogenous variable, real physical capital stock and real investment on education and labor used as explanatory variables. The data of all variables were extracted from WDI. The results of the research indicated that schooling expenditure has positively influence on economic growth of selected china's cities.

Rehman, Tariq, and Khan (2018) observed the association of human capital and economic growth of nominated central Asian nations. This research covered the data of nominated central Asian countries Kyrgyzstan, Tajikistan and Kazakhstan from 1999 to 2015. Panel least squares model used for econometric estimation. The result of the study indicate that government spending on schooling, government spending on health and secondary education have positively but insignificant influence on economic development.

Ada and Acaroglu (2014) evaluated the relationship of human capital and economic development of MENA states. This research used the data span from 1990-2011. FEM and REM used for econometric estimations. The findings of the research indicate that all proxy variables used for human capital positively influence on economic development of MENA states. The authors also find out that standard of schooling improve the growth of country.

Eggoh, Houeninvo, and Sossou (2015) purposed that effect investment in humans on economic development of 49 African states. This research contains panel data of 15 years from 1996 to 2010. Econometric valuation is done by panel technique Generalized Method of Moment (GMM). The results of research indicate that health expenditure and education has negative influence on economic development of nominated African states. The authors find out that underinvestment, bureaucracy, corruption and inefficiency of institutions were main reason of this negative effect.

Qadri, Sultan, and Waheed (2011) studied the nexus of investing in human and economic development of 106 high income and low middle income states. This study used Ordinary least squares method for pragmatic examination. The data span of the study is from 2002-2008. The findings of the study explain that all explanatory variables positively influence on economic development.

Pescu and Stefan (2016) investigated the link among human investment and economic development in 29 European states following the yearly data from 2000-2013. FEM and REM and were three different models used in this research for econometric estimation. The data of all variables were extracted from WDI and Eurostat. The results of the research indicate that there exist positive correlation all explanatory variables except social protection expenditure. The author find out there is negative connection between fixed capital formation and social protection expenditure.

Kadir, Azwardi, Wardhani, Novalia, and Maulana (2018) tested the role of health spending, education spending and gross fixed capital formation on economic development of South Sumatra province of Indonesia. This study consists of 14 districts of South Sumatra for the duration of 2010 to 2015. OLS model, FEM and REM three different econometric approaches



used for empirical analysis. The data attained from the World Bank Database and fiscal ministry of finance. The main findings of research showed that spending on healthiness and education and labor have positively influence on growth of selected district of South Sumatra province.

Jameel and Naeem (2016) inspected the association among human being investment and economic growth of 11 nominated states. This research based used the data span from 1992-2014. For econometric estimation panel ADF unit root test, DOLS and FMOLS model applied. The findings of research revealed that all variables have positively influence on economic development except inflation.

Wang and Liu (2016) propose the connection of human investment and economic development of 55 countries. This research used annually data for data spanning 1960-2009. The study used FEM and REM for the econometric estimation. The data sources used in this study were Groningen Growth and development center, dataset of Barro and Lee and WDI. The findings of the research exhibited that human investment has positively influence on the economic growth of selected states.

Frank (2018) inspected the connection of human capital investment and economic development of 179 particular states. This research used annually for examination from 1970 to 2014. For econometric estimation Ordinary Least squares (OLS) applied. Data of selected variables were taken from WDI and Penn World Tables. The results of the research indicate that education expenditure has positively impact on economic development.

Huang, Tang, Peng, and Xiao (2015) evaluated the influence of human capital investment on economic growth of 31 provinces of China. This study used annually data from 2001-2011. Two stage least squares and Gaussian mixture model used for empirical analysis. The required data were extracted from China Health Statistical Yearbook. The results of the research showed that healthiness and schooling expenditure have positively influence on economic growth in all provinces but there exist development disparities among regions.

H. S. Ali, Yusop, and Hook (2015) investigated that the influence of human investment improvement on the economic growth using annually of Pakistan from 1972-2011. The findings of this research are that some variables had positively and dominant influence on economic development, while others had negative and significant influence on GDP in Pakistan.

Mankiw, Romer, and Weil (1992) investigated the stability of model of exogenous growth introduced by Solow (1956) using cross-country data from 1960-1985. The findings of this study exposed economic growth not depend upon only physical capital but human capital also plays substantial impression on the growth of any country.

Hadir and Lahrech (2015) analyzed that the association among human capital formation and economic development with annually data for data span of 1973-2011. In this study authors used OLS econometric technique. The results of this research explained that all variables had optimistic relationship between human capital formation and economic growth.

Theories of Human Capital Development and Economic Growth

Human Capital Theory

Theory of human capital indicates that level of education leads to improving competence and output of workforce by enhancing the smooth of their intellectual abilities. Schultz, Jacob Mincer and Gory Bucker presented the idea that individuals spending on human capital for increasing the knowledge and healthiness. Example of such spending contains investment in education,



health, on- job training and nourishment. The formation of human capital shows the significant part in the growth of a nation. Human capital thinkers have recognized that elementary knowledge increases the efficiency of labors low skill professions.

The Modernization Theory

This theory emphasis on how education converts people worth, trust and performance. Introduction to modernization institutes such as universities, mass media and factories instruct modern standards and approaches. The approach contain honesty to fresh awareness, freedoms from old-fashioned establishments, and enthusiasm to idea and estimate additional necessities and increasing wisdom of individual and societal efficiency. Theorists explore that these normative and attitudinal variations remain through the life cycle, everlastingly changing the person’s association with the societal organization. The larger numbers of individuals showing to renewal institutes, the better the level of specific innovation achieved by the people.

The human capital theory framework of Becker

Human capital theory, formalized by Becker (1962) but basically established by others, helps us recognize the training activities of firms. It reestablished the view that education and training exemplify investment in future productivity and not just depletion of resources. In this viewpoint, firm and workers identical depend on investments in human capital to increase effectiveness, returns, and wage. Although investments in human capital vary from those in physical capital, in that the firm does not attain a property right over its investments in skill, investments in the skills of its workforce involve collaboration with the employees to be trained.

Model Specification

$GDP_{it} = f(\text{Education Expenditure}_{it}, \text{Health Expenditure}_{it}, \text{Gross Fixed Capital Formation}_{it}, \text{Labor Force}_{it}, \text{Inflation}_{it})$

The regression equation based on the above function from that is stated below.

$$\ln GDP_{it} = \beta_0 + \beta_1 EEXP_{it} + \beta_2 HEXP_{it} + \beta_3 GFCG_{it} + \beta_4 LF_{it} + \beta_5 INF_{it} + \varepsilon_t$$

Where

Subscript i = 1 N shows number of country, t = 1 T shows time and ln is the natural log, β_0 is the intercept and $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are the slope parameters. ε_t denotes the error term.

LnGDPpc = Log of Gross Domestic Product per capita

EEXP = Education Expenditure

HEXP = Health Expenditure

GFCF = Gross Fixed Capital Formation

LF = Labor Force

INF = Inflation

In the above model, endogenous variable GDP is taken by Gross Domestic Product per capita purchasing power parity current international \$ is used for economic growth. Education expenditure as proportion of GNI, Health spending as proportion of gross domestic product, Gross fixed capital formation is measured by proportion of GDP, labor force measured in million and inflation is measured by consumer price annual percentage.

Table 3.1 Description and Measurement of Variables

Variables	Description	Measurement	Source
LnGDPpc	Log of Gross Domestic Product	Per Capita Purchasing Power Parity current international \$	WDI



EEXP	Education Expenditure	Percentage of GNI	WDI
HEXP	Health Expenditure	Percentage of GDP	WDI
GFCF	Gross Fixed Capital Formation	Percentage of GDP	WDI
LF	Labor Force	In millions	WDI
INF	Inflation	Consumer Price annual percentage	WDI

Source: Compiled by author

Data Source

We examined the sample of 12 selected countries from SAARC and ASEAN. In this study Bangladesh, Pakistan, Indonesia and Malaysia are 4 Muslims countries and Cambodia, Philippines, Singapore, Bhutan, India, Nepal, Sri Lank and Thailand are 8 Non-Muslims countries are selected for analysis. The data span from 2001 to 2015 due to constraint of data availability and want to obtain more advanced policy implications. Annually data applied in this research. The data used for GDP, education expenditure, health expenditure, gross fixed capital formation, labor force and inflation are obtain from World Development Indicator (WDI). Gross fixed capital formation, education expenditure and health expenditure are core variables and labor force and inflation are controls variables of the study. All core variables explain the impact of human capital investment and physical capital investment on economic growth.

Research Methodology

To observe the influence of human capital investment and physical capital investment on economic growth in Muslims and Non-Muslims countries, study employed panel data techniques such as: unit root test, cointegration test and Fully Modified Ordinary Least Square (FMOLS) method.

Panel Unit Root Test

Unit root test for panel data is generally helpful to analyze the existence of stationarity in the variables. For panel data different tests have been introduced such as Hadri (2000), Breitung (2001), Levin, Lin, and Chu (2002), Im, Pesaran, and Shin (2003). The present study in order to observe stationarity used Im et al. (2003) test of unit root.

Panel Cointegration Test

After specifying the order of integration for the data series of our sample, we employed the panel cointegration methods to data. There are many kinds of panel cointegration tests like P. Pedroni (1999) and Kao (1999).

According to Pedroni test for cointegration, if variables that applied in the research have a panel unit root, then P. Pedroni (1999) test for cointegration can be applied. In this study we used Pedroni cointegration technique. This test allows analyzing the relationship of the variables in the long run. Cointegration test used the regression equation as follows:

$$Y_{it} = \alpha_1 + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_k X_{kit} + \varepsilon_{it}$$

Where

Subscript $t = 1 \dots T$ stands for duration and $i = 1 \dots N$ represent countries and $j = 1 \dots k$ denotes length of independent variables. X and Y are presumed to be order 1 integration i.e. $I(1)$. α_1 represent intercept term, $\beta_1, \beta_2, \dots, \beta_k$ are the slope of coefficients and ε_{it} is residual term. Seven statistics for cointegration developed by P. Pedroni (1999) can be applied for investigation the



null hypothesis in the panel of heterogeneity. Of these seven statistics, four are within-dimension and three are between-dimension.

Fully Modified Ordinary Least Square (FMOLS)

Having recognized that linear order that preserve the variables in the relationship to one another in long term, this research continue to make individual long-run estimates. This study utilized Fully Modified Ordinary Least Square (FMOLS) presented by P. Pedroni (2001). FMOLS method not only provides reasonable estimates of parameters quite small samples but it handles regressor's endogeneity and also serial correlation. FMOLS considered the existence of constant term and likely correlation among error term and regressor's differences. The basic assumption of this model is that variables are cointegrated at first difference.

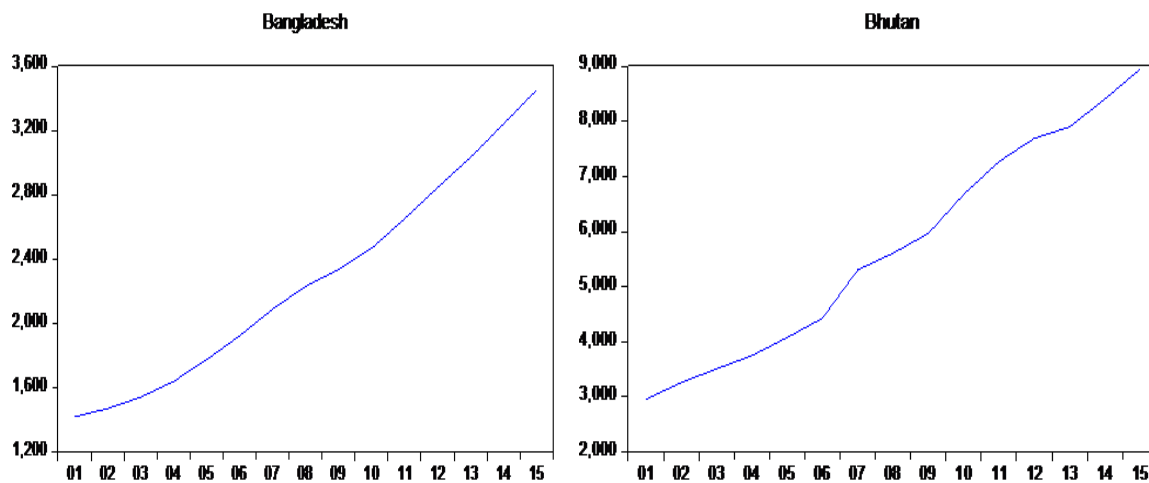
$$Y_{it} = \alpha_i + \beta_i X_{it} + \varepsilon_{it}$$

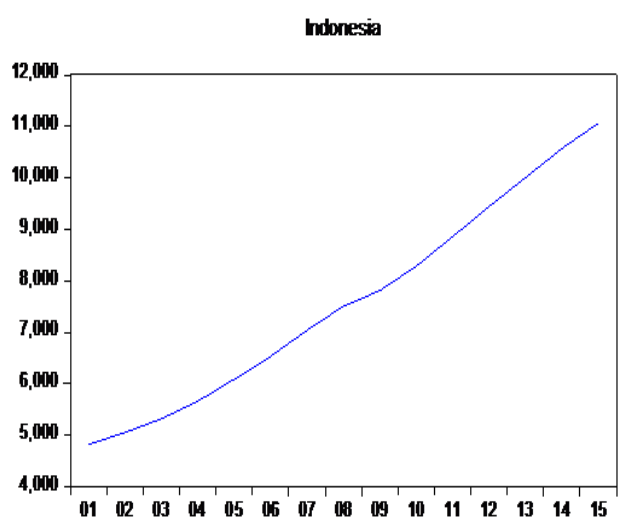
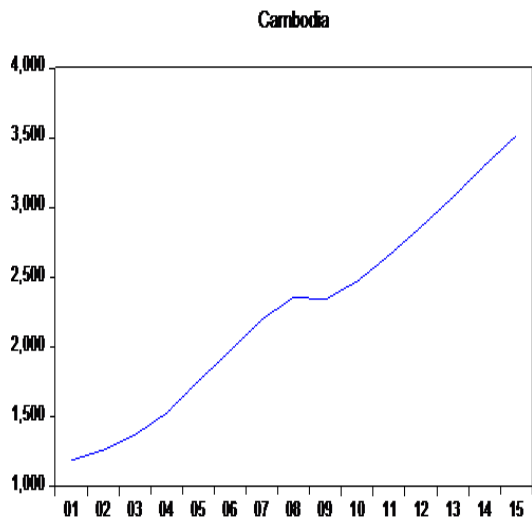
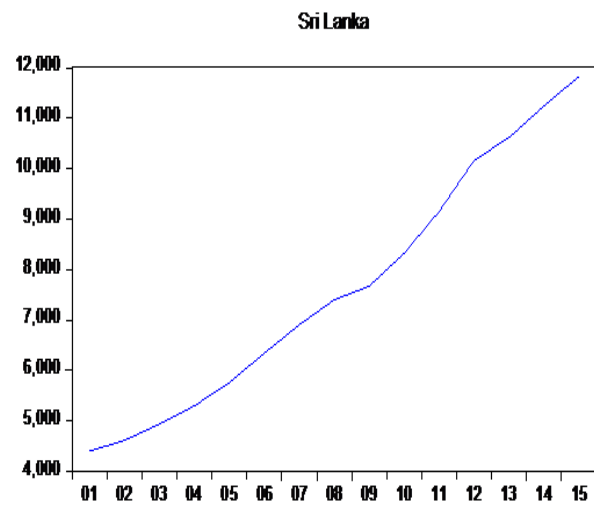
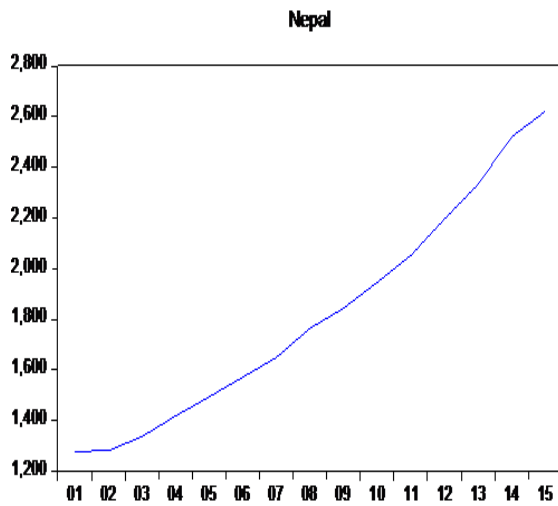
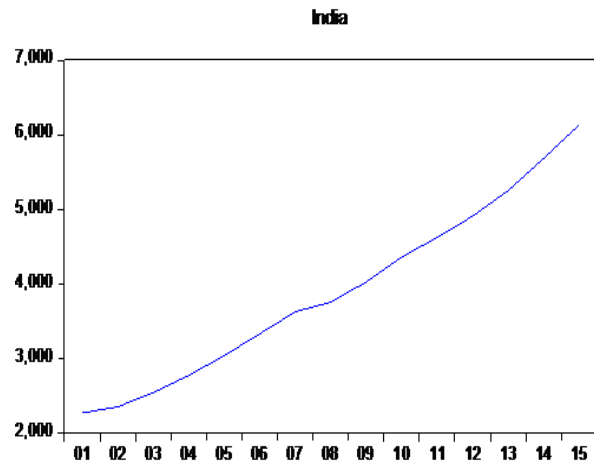
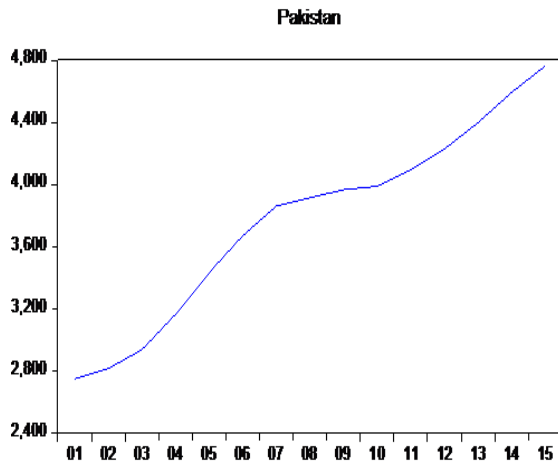
$t = 1 \dots T$ stands for time and $i = 1 \dots N$ represent countries. Y_{it} is dependent variable X_{it} is independent variable and they are cointegrated with slopes β_{it} .

$$Y_{it} = \alpha_i + \beta X_{it} + \sum_{k=-ki}^{ki} \gamma_{ik} \Delta X_{it} - k + \varepsilon_{it}$$

Graphical Analysis of the Trend of the variables

We have done graphical analysis to analyze the trend of the variables in the analysis.





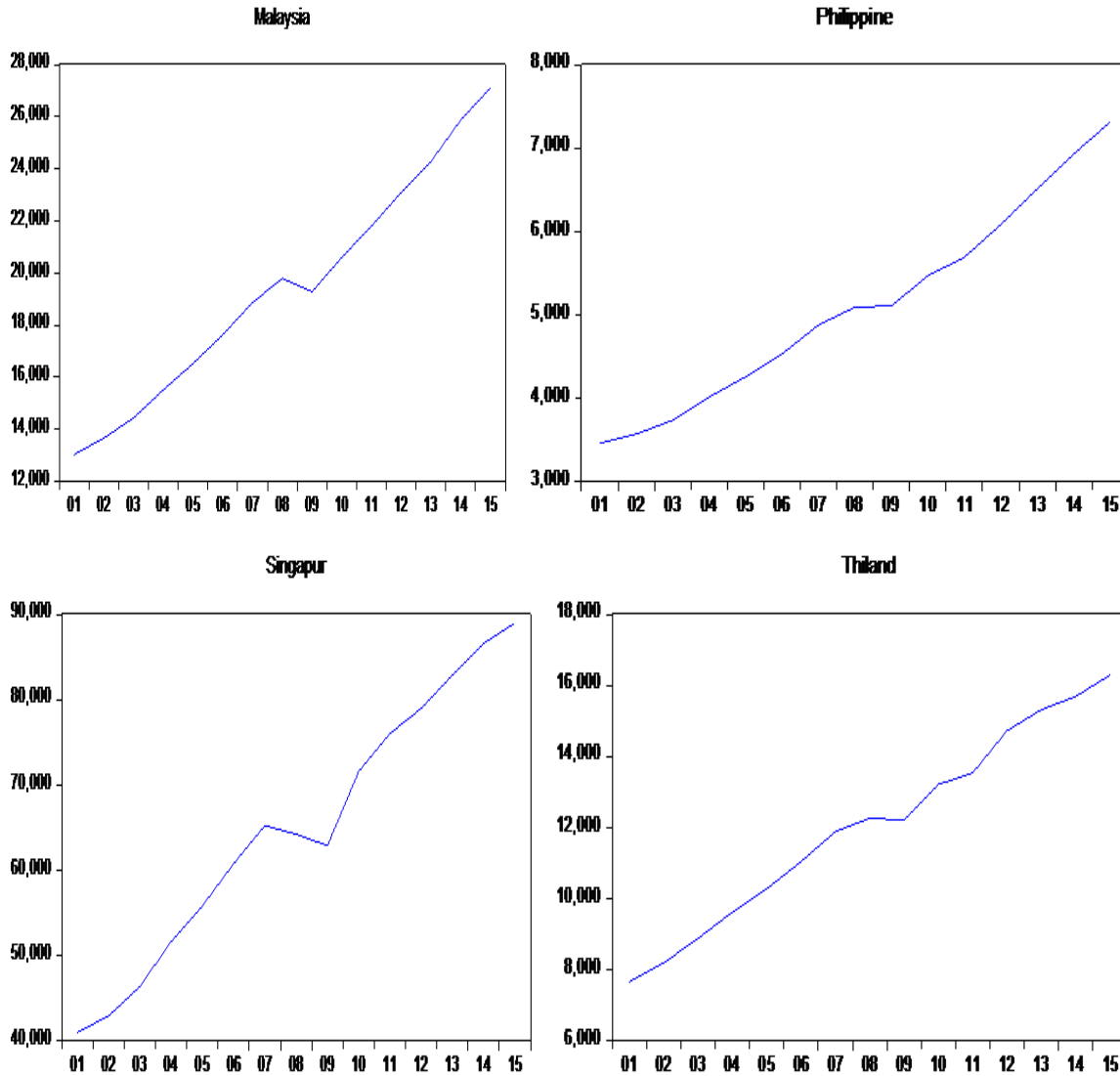
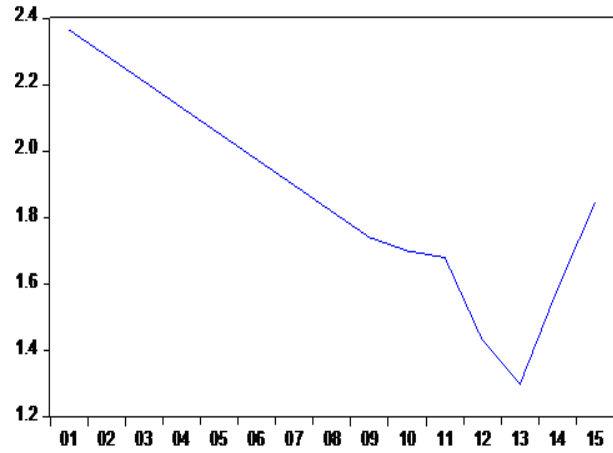
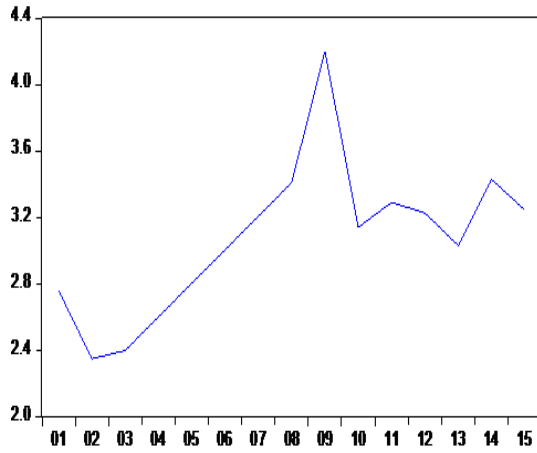
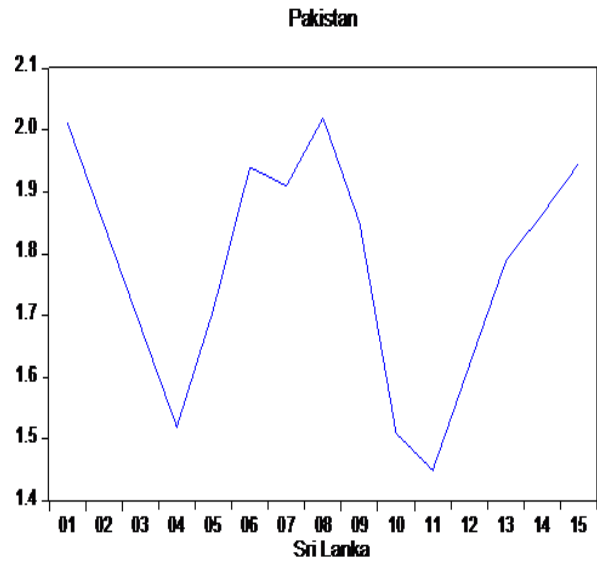
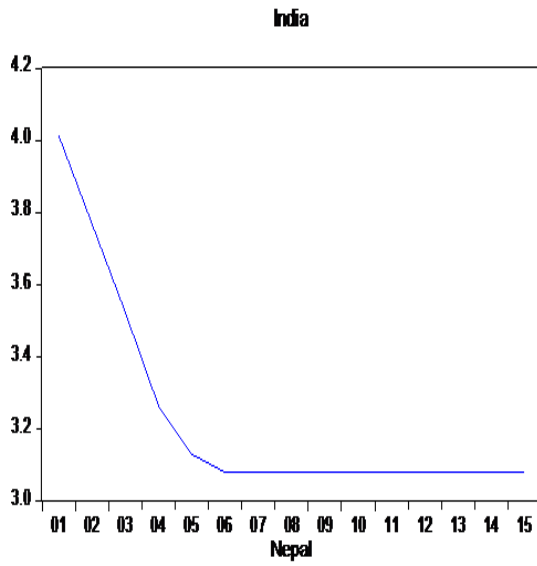
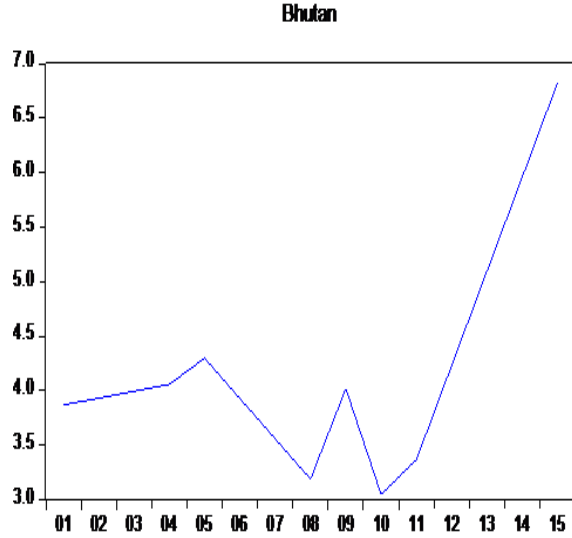
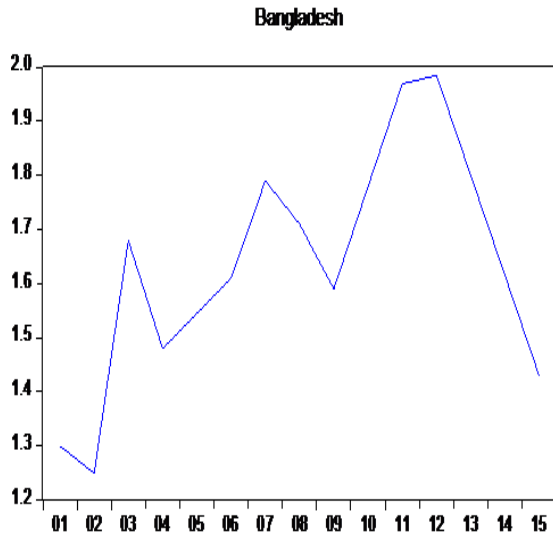
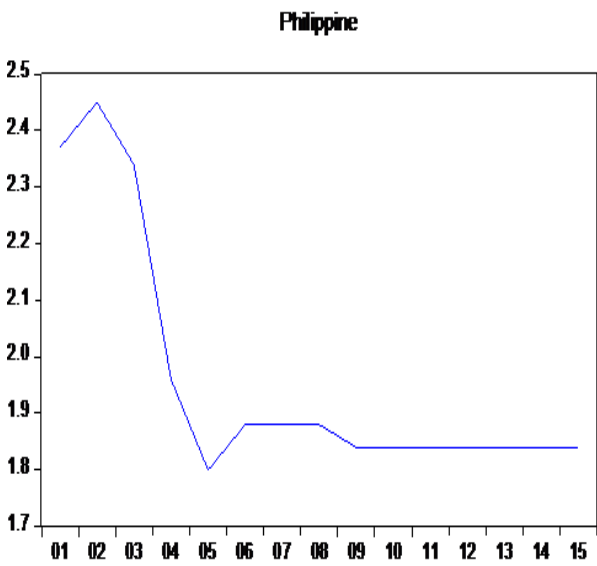
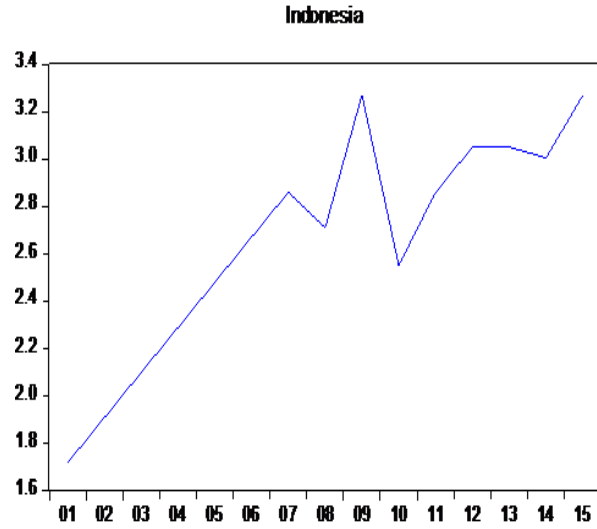
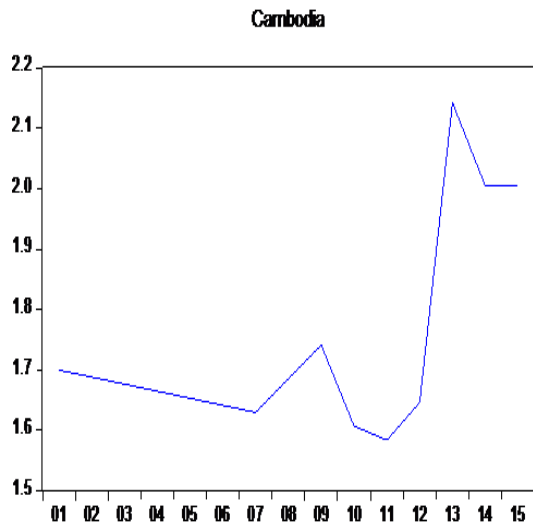


Figure 1: Gross Domestic Product (GDP) per capita purchasing power parity

The time series graphs of GDP per capita purchasing power parity for each economy of Muslims and Non-Muslims regions is shown in figure(1). For each of the above country, GDP per capita PPP have a positive trend across time and economy performance of Nepal, Bangladesh, India and Indonesia is seen as impressive because there is no huge decline in trend and GDP has rising and fairly tight leaner trend. The largest economy in Muslims countries is Malaysia and smallest economy is Bangladesh and largest economy in Non-Muslims countries is Singapur and smallest economy is Nepal.





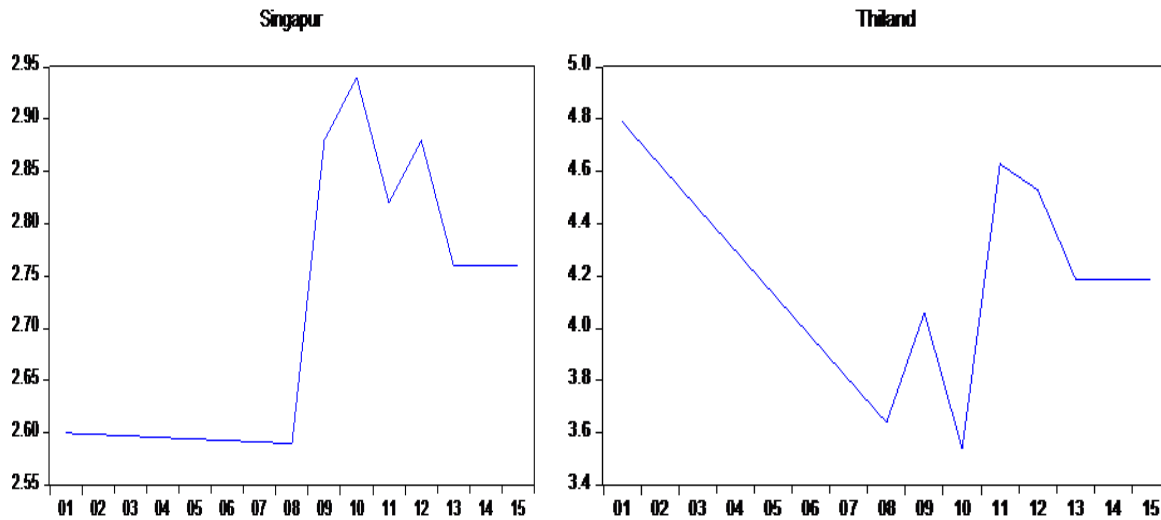


Figure 2: Education Expenditure percentage of GNI

The time series graphs of education expenditure for each country of the Muslims and Non-Muslims regions are shown in figure (2). For each of the above country, education expenditure has a huge decline and fluctuations across the time and the trend can be seen differs country by country. The largest economy of spending on education in Muslims countries is Malaysia and smallest economy is Bangladesh and largest economy in Non-Muslims countries is Bhutan and smallest economy is Cambodia.

Table 5.2 Panel Unit Root

IPS					
Variables	Level		1 st Difference		Order of Integration
	T-statistics	P-value	T-statistics	P-value	
GDP	10.737	1.000	-4.585	0.000*	I(1)
EEXP	-0.105	0.458	-8.755	0.000*	I(1)
HEXP	0.403	0.657	-7.729	0.000*	I(1)
GFCF	-0.697	0.243	-5.409	0.000*	I(1)
INF	-0.845	0.199	-10.857	0.000*	I(1)
LF	5.160	1.000	-3.266	0.000*	I(1)

Note: * shows significance level at 1% and values are adjusted to three decimal places.

The results of the panel unit root test from IPS for level and 1st difference series of GDP, GFCF, EEXP, HEXP, INF, and LF are presented here. According to IPS test, for all variables null hypothesis cannot be rejected in level at 1% of significance level. So it is rejected by taking 1st difference level, at 1% of significance for all variables means their probability value is less than significance. As this is the precondition of FMOLS that stationarity of all variables should be at 1st difference. In conclusion unit root test for panel analysis rejected the hypothesis at 1st difference and thus shows that stationarity of all variables exist on order one.

Table 5.3 Pedroni Cointegration Results

Dependent Variable : Gross Domestic Product (GDP)				
Within Dimension	With No Trend		With Trend and Intercept	
	T-Statistics	P-Value	T-Statistics	P-Value



Panel v-statistics	-3.876	0.999	1.581	0.056**
Panel rho-statistics	3.329	0.999	4.487	1.000
Panel PP-statistics	0.962	0.832	-5.256	0.000*
Panel ADF-statistics	0.237	0.594	-4.667	0.000*
Between Dimension				
Group rho-statistics	4.823	1.000	6.197	1.000
Group PP-statistics	0.208	0.582	-7.204	0.000*
Group ADF-statistics	0.499	0.691	-3.355	0.000*

Note: * and ** show level at 1% and 5% respectively and values are adjusted to three decimal places.

After knowing the stationarity of variables, now present study continue to apply panel Pedroni cointegration technique to know the presence of an equilibrium relationship in long-run between the variables. Findings of cointegration tests in panel analysis are presented in Table 5.3. By applying panel cointegration test suggested by P. Pedroni (1999) it is detected that variables are cointegrated at the significance level 1% and 5%.

Table 5.4 FMOLS (Muslim Countries)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EEXP	0.244101	0.073951	3.300858	0.0018*
HEXP	2.433615	0.131044	18.57096	0.0000*
GFCF	0.021565	0.011377	1.895473	0.0637**
INF	0.065392	0.017946	3.643886	0.0006*
LF	0.006008	0.002130	2.820886	0.0068*

Note: * shows significance level at 1% and ** shows significance level at 10%

Countries: Pakistan, Bangladesh, Indonesia, Malaysia

Table 5.4 shows the results of Muslims countries of our panel. In case of Muslims countries our results of gross fixed capital formation indicates positively and substantial relationship. If GFCF increases by one unit than gross domestic product will rise by 0.021565 units. The results of education expenditures have positively and statistically important influence on economic development. If education expenditure rises by one unit than economic growth will increase by 0.244101 units. Health expenditure also indicates positive and significant influence on economic growth in case of Muslims countries. Increase in one unit of health expenditure will increase the gross domestic product by 2.433615 units. The impact of inflation and labor force has positively and significant influence on economic growth in Muslims countries.

Table 5.5 FMOLS (Non-Muslim Countries)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EEXP	0.102185	0.010002	10.21615	0.0000*
HEXP	0.059638	0.010198	5.847820	0.0000*
GFCF	0.011243	0.001085	10.35862	0.0000*
INF	0.010639	0.001108	9.603764	0.0000*
LF	0.019117	0.000670	28.51552	0.0000*



Note: * shows significance levels at 1%.

Countries: Cambodia, India, Nepal, Sri Lanka, Bhutan, Philippine, Singapore, Thailand.

Table 5.5 shows the results of Non-Muslims countries of our panel. In case of Non-Muslims countries our results of gross fixed capital formation indicates positive and significant relationship. If gross fixed capital formation increases by one unit than GDP will increase by 0.011243 units. The results of education expenditures have positive and significant influence on economic growth. If education expenditure rises by one unit than economic growth will rise by 0.102185 units. Health expenditure also indicates positive and significant impact on economic growth. Increase in one unit of health expenditure will raise the GDP by 0.059638 units. The impact of inflation and labor force has positive and significant effect on economic growth in Non-Muslims countries.

Table 5.6 FMOLS (Muslims and Non-Muslims)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EEXP	0.083731	0.007197	11.63380	0.0000*
HEXP	0.087777	0.008135	10.79066	0.0000*
GFCF	0.011870	0.000864	13.73367	0.0000*
INF	0.011066	0.000843	13.12871	0.0000*
LF	0.020583	0.000488	42.15724	0.0000

Note: * shows significance levels at 1%.

Countries: Pakistan, Bangladesh, India, Sri Lanka, Bhutan, Nepal, Cambodia, Indonesia, Malaysia, Philippine, Singapore, Thailand.

Table 5.6 shows findings of the study suggest that spending on education shows significant role in the improvement of human capital of a country. If education expenditure increases by one unit than dependent variable gross domestic product increase by 0.083731 units and relationship is significant. Our findings are reliable with the previous studies like R.J Barro (1995).

The effect of health expenditure found to be positive on economic growth. If health expenditure increases by one unit than gross domestic product increase by 0.087777 units and it is significant at 1 percent level of significance. Our findings are reliable with literature like Balaji (2011) confirmed that there exists positively association among healthiness spending and economic growth.

The influence of gross fixed capital formation on economic growth is positively and statistically significant. Singer (1950) examined that capital formation depends upon tangible good e.g tools, plants and machinery and intangible goods e.g health, high standard of education and scientific knowledge. Our results shows that if gross fixed capital formation (GFCF) increase by one unit than gross domestic product will increase by 0.011870 units and it shows significant at 1% confidence level of significance.

Inflation effects the economic growth and human development of any country in positive as well as negative way. The results indicate that inflation increase by one unit than economic growth will rise by 0.011066 units. Our findings are reliable with the previous study like Fabayo and Ajilore (2006). Hye and Lau (2015) examined about the study of India that confirmed there is positively connection among inflation and economic development.

Our results shows that if labor force rate increase by one unit than dependent variable economic growth will increase by 0.020583 units and results shows positive and significant relationship



between labor force and economic growth. Shahid (2014) studied that confirmed there is exists optimistic and positively association between labor force and economic development.

Discussion

The research analyzed the impact of human capital investment on economic growth. The findings of our research indicate that reliable association among human capital, physical capital and economic growth but influence human capital and physical capital is different on economic development. The positive association between human capital and physical capital is consistent with previous studies like Ashton, Green, Sung, and James (2002); Q. Abbas and E. Mujahid-Mukhtar (2000) and Mankiw et al. (1992) also have the same standpoints which show that investing in human is the most important for the betterment of economic development.

Endogenous growth model followers like P. M Romer (1990) and R. J. Barro (1990) authorized the detail that spending in human stimulate the economic development is positive and significant. Therefore, the spending on schooling has progressive influence on both the singular man power and the economy. These results relate with many previous studies like Muktdair-Al-Mukit (2012) studied that education spending has positive and significant influence on economic development. Mallick, Das, and Pradhan (2016) examined dynamic of schooling spending and economic development in nominated 14 main Asian nations by using Fully Modified Ordinary Least Square (FMOLS) techniques that show positive influence on economic development in that countries.

Health can influence economic growth by enhancing workforce productivity and this productivity can grow with the investment in health. The result of this research indicates that spending on health has positively and significant influence on economic development. Many previous studies justify our results significance such as Summers and Heston (1991) and Beraldo, Montolio, and Turati (2005) report that healthiness expenditure has significant influence on economic development of counties.

When gross fixed capital formation increased (GFCF) promote in economic development in economic state the employment opportunities develop, people tend to more spend for living standard because they have better per head earning. The results of this research also reliable with relationship and describe a positive connection between GFCF and economic development. Our study results consistent with Apergis and Payne (2010) that indicates positively and significant connection exist between GFCF and economic development.

Labor force has positive influence on economic growth for long-run of panel FMOLS results which indicate that labor force actively participate in economic activities. The economic channel behind this results refers the situation when more labor actively participate in economic activities the level of output increase which increase their per head earnings.

Conclusions

This research is an effort to discover the influence of human capital investment on economic growth with 12 countries with duration of 2001-2015. In this study panel of 4 Muslims countries (Bangladesh, Pakistan, Indonesia, and Malaysia) and 8 Non-Muslims countries (Cambodia, Philippine, Bhutan, Nepal, India, Sri Lanka, Singapore and Thailand) are selected from SAARC and ASEAN regions. The study uses four main variables. GDP used as endogenous variable while gross fixed capital formation, spending on education and healthiness are exogenous variables. Spending on education and health used for human capital and GFCF used for physical



capital. The major purpose of this research is to find the influence of human capital investment and physical capital investment on economic growth in Muslims and Non-Muslims countries because there is very sufficient literature regarding this issue in both regions. The variables of our study have same order of integration. So, we used FMOLS approach for econometrics estimation. The result of panel FMOLS shows that human capital investment and physical capital investment has positively influence on economic growth in both zones. To support the relationship between human capital investment and physical capital investment we use set of control variables and panel FMOLS show that labor force and inflation effect positively to this relationship. Finally this research determined that both human capital investment and physical capital investment have significant role in promoting the economic growth and education expenditure variable is more effective to increase economic growth.

First, a main limitation of this research is the problem of availability of data of certain variables e.g. health and education expenditure. Data is taken from 2001-2015. From the earlier 2001 the data of previous is not available such as sample data of health expenditure. Second, the study consist of only 12 countries from both regions (SAARC and ASEAN) like Bangladesh, Pakistan, Indonesia and Malaysia, are Muslims countries and Cambodia, Bhutan, India, Sri Lanka, Nepal, Philippine, Singapore and Thailand are Non-Muslims countries due to limitations for data availability for Afghanistan, Maldives, Brunei, Lao PDR, Myanmar and Vietnam so there are six states are not included in the research. It would be inspiring for further researches to introduce other macroeconomic variables that may better describe the link of human investment and economic development.

This research can be enhanced by focusing on country specific and disaggregates analysis for more appropriate policy implications. It follows that higher income countries could behave differently with prospective of investing in human and technology spending as compared to low income countries.

Based on empirical results there is suggestion for improving economic development the structure of spending in human and spending on physical capital should improve in both regions. The institution should be less corrupt for the wellbeing of regions. There is need to improve all the dimensions of governance e.g. economic and institutional which can provide the basis for good governance. There is a responsibility of administration to offer inducements for professionals to improve the level of quality education and health.

References

- Abbas, Q., & Mujahid-Mukhtar, E. (2000). The role of human capital in economic growth: a comparative study of Pakistan and India. *The Pakistan development review*, 451-473.
- Abbas, Q., & Mujahid-Mukhtar, E. (2000). The role of human capital in economic growth: a comparative study of Pakistan and India. . *The Pakistan development review*,, 39(4), 451-473.
- Ada, A. A., & Acaroglu, H. (2014). Human capital and economic growth: A panel data analysis with health and education for MENA region. *Advances in Management and Applied Economics*, 4(4), 59-67.
- 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.



- Akpolat, A. G. (2014). The long-term impact of human capital investment on GDP: a panel cointegrated regression analysis. *Economics Research International*, 2(5), 1-10.
- Alataş, S., & Çakir, M. (2016). The effect of human capital on economic growth: A panel data analysis. *Journal of Management Sciences*, 14(27), 539-555.
- Ali, H. S., Yusop, Z. B., & Hook, L. S. (2015). Financial development and energy consumption nexus in Nigeria: An application of ARDL bound testing approach. *International Journal of Energy Economics and Policy*, 5(3), 816-821.
- Ali, M., Egbetokun, A., & Memon, M. (2018). Human capital, social capabilities and economic growth. *Economies*, 6(1), 2-15.
- Apergis, N., & Payne, J. E. (2010). Renewable energy consumption and economic growth: evidence from a panel of OECD countries. *Energy policy*, 38(1), 656-660.
- Ashton, D., Green, F., Sung, J., & James, D. (2002). The evolution of education and training strategies in Singapore, Taiwan and S. Korea: A development model of skill formation. . *Journal of education and work*, 15(1), 5-30.
- Awan, A. G., & Kamran, A. (2017). Testing and Assessment of large classes in English Language. *Global Journal of Management, Social Sciences and Humanities*, 3(4), 622-650.
- Balaji, B. (2011). Causal nexus between public health expenditure and economic growth in four southern Indian states. . *IUP Journal of Public Finance*, 9(3), 7-22.
- Barro, R. J. (1990). Government spending in a simple model of endogenous growth. *Journal of political economy*, 98(5), 103-125.
- Barro, R. J. (1995). Economic growth in a cross section of countries. . *Quarterly Journal of Economi*, 106(2), 407-433.
- Barro, R. J. (2001). Human capital and growth. *American economic review*, 91(2), 12-17.
- Barro, R. J., & Lee, J. W. (1993). International comparisons of educational attainment. . *Journal of monetary economics*, 32(3), 363-394.
- Beraldo, S., Montolio, D., & Turati, G. (2005). Healthy, educated and wealthy: is the welfare state really harmful for growth? *Working Paper no. 127. Universitat de Barcelona*.
- Breitung, J. (2001). The local power of some unit root test for panel data. In Nonstationary panels, panel cointegration, and dynamic panels. *Emerald Group Publishing Limited*, 5(4), 161-177.
- Chuang, J., & Sollenberger, N. (2000). Beyond 3G: Wideband wireless data access based on OFDM and dynamic packet assignment. *IEEE Communications Magazine*, 38(7), 78-87.
- Eggoh, J., Houeninvo, H., & Sossou, G. A. (2015). Education, health and economic growth in African countries. *Journal of Economic Development*, 40(1), 93-99.
- Fabayo, J. A., & Ajilore, O. T. (2006). Inflation: How much is too much for economic growth in Nigeria. . *Indian Economic Review*, 17(4), 129-147.
- Frank, N. (2018). Making the grade: The contribution of education expenditure to economic growth. *Undergraduate Economic Review*, 14(1), 11-25.
- Funke, M., & Strulik, H. (2000). On endogenous growth with physical capital, human capital and product variety. . *European Economic Review*, 44(3), 491-515.



- Gebrehiwot, K. G. (2016). The Impact of Human Capital Development on Economic Growth in Ethiopia: Evidence from ARDL Approach to Co-Integration. *Bahir Dar Journal of Education*, , 16(1), 221-234.
- Hadir, M. A., & Lahrech, A. (2015). Human Capital Development and Economic Growth in Morocco. . *International journal of Information, Business and Management*,, 11(3), 43-49.
- Hadri, K. (2000). Testing for stationarity in hetrogenous panel data. . *The Econometrics Journal*, 3(2), 148-161.
- Haldar, S. K., & Mallik, G. (2010). Does human capital cause economic growth? A case study of India. *International Journal of Economic Sciences & Applied Research*,, 3(1), 181-188.
- Hanushek, E. A. (2013). Economic growth in developing countries: The role of human capital. *Economics of Education Review*,, 37(1), 204-212.
- Huang, X., Tang, L., Peng, Y., & Xiao, Z. (2015). Mathematical Models and Effectiveness Analysis of Government Educa-tion and Health Expenditures on Economic Growth. *Open Cybernetics & Systemics Journal*,, 9(3), 1409-1415.
- Hussain, M. I., & Zafar, T. (2017). The Impact of Public Expenditure Components on Economic Growth in Pakistan. . *European Online Journal of Natural and Social Sciences*,, 6(3), 378-386.
- Hye, Q., & Lau, W. Y. (2015). Trade openness and economic growth: empirical evidence from India. . *Journal of Business Economics and Management*,, 16(1), 188-205.
- Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. . *Journal of econometrics*,, 115(1), 53-74.
- Jameel, S., & Naeem, M. Z. (2016). Impact of Human Capital on Economic Growth: A Panel Study. . *Bulletin of Business and Economics (BBE)*,, 5(4), 231-248.
- Kadir, S. A., Azwardi, A., Wardhani, R. S., Novalia, N., & Maulana, A. (2018). The Impact of Physical and Human Capital on The Economic Growth of Agricultural Sector in South Sumatera. *International Journal of Economics and Financial Issues*, 8(4), 322-326.
- Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. . *Journal of econometrics*,, 90(1), 1-44.
- Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of econometrics*,, 108(1), 1-24. .
- Liao, L., Du, M., Wang, B., & Yu, Y. (2019). The impact of educational investment on sustainable economic growth in Guangdong, China. *A cointegration and causality analysis. Sustainability*, 11(3), 766-779.
- Mallick, L., Das, P. K., & Pradhan, K. C. (2016). Impact of educational expenditure on economic growth in major Asian countries :Evidence from econometric analysis. . *Theoretical & Applied Economics*, 23(2), 198-212.
- Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *The quarterly journal of economics*, 107(2), 407-437.
- Marshall, A. (1920). Principles of economics, book 5. Chapter. II. 4, 23.
- Muktdair-Al-Mukit, D. (2012). Public expenditure on education and economic growth: the case of Bangladesh. . *International Journal of Applied Research in Business, Administration & Economics*,, 2(5), 101-108.



- Nelson, R. R., & Phelps, E. S. (1966). Investment in humans, technological diffusion, and economic growth. . *The American economic review*, 56(1), 69-75.
- Omitogun, O., Osoba, A. M., & Tella, S. A. (2016). An Interactive Effect of Human Capital Variables and Economic Growth in Nigeria. *Acta Universitatis Danubius. Economica*, 12(5), 112-123.
- Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and statistics*, 61(1), 653-670.
- Pedroni, P. (2001). Panel cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. . *Econometric theory*, 20(3), 597-625.
- Pelinescu, E. (2015). The impact of human capital on economic growth. *Procedia Economics and Finance*, 22(1), 184-190.
- Pescu, M., & Stefan, C. (2016). The effects of gaps and disparities on economic growth. A study of 10 former socialist countries from central eastern europe, members of the eu. . *Amfiteatru Economic*, 18(43), 592-599.
- Qadri, Sultan, F., & Waheed, A. (2011). Human capital and economic growth: Time series evidence from Pakistan. . *Pakistan Business Review*, , 1(1), 815-833.
- Rehman, Z. U., Tariq, M., & Khan, M. A. (2018). The Role of Human Capital in Economic Development in the Selected Central Asian Countries. . *Dialogue (Pakistan)*, 13(3), 234-245.
- Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of political economy*, 94(5), 1002-1037.
- Romer, P. M. (1990). Endogenous technological change. *Journal of political economy*, 98(5), 71-102.
- Schultz, T. W. (1961). Investment in human capital. *The American economic review*, 7(3), 1-17.
- Shahid, M. (2014). Impact of labour force participation on economic growth in Pakistan. *Journal of Economics and Sustainable Development*, 5(11), 89-93.
- Singer, H. W. (1950). American economic association the distribution of gains between investing and borrowing countries. . *The American economic review*, 40(2), 473-485.
- Summers, R., & Heston, A. (1991). The Penn World Table (Mark 5): an expanded set of international comparisons, 1950–1988. . *The quarterly journal of economics*, 106(2), 327-368.
- Uzawa, H. (1965). Optimum technical change in an aggregative model of economic growth. *International economic review*, 6(1), 18-31.
- Wang, Y., & Liu, S. (2016). Education, Human Capital and Economic Growth: Empirical Research on 55 Countries and Regions (1960-2009). *Theoretical Economics Letters*, 6(2), 347-365.