

TRADE LIBERALIZATION, HUMAN CAPITAL AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM SELECTED ASIAN COUNTRIES

ATIF KHAN JADOON, HAFIZ ABDUR RASHID AND AAMIR AZEEM*

Abstract. Countries around the globe are liberalizing their trade policies for the maximum gains due to comparative advantage. Trade is considered as one of the primary tools to increase the economic growth. There are four main channels in literature through which trade liberalization affects economic growth: capital accumulation, equality of factor prices among countries, knowledge transfers and technology transfers. Last two channels are related to the human capital of the country. The more open economy will have larger benefits from trade openness, if country has absorbing capacity of new technology. The present study has been designed to see the impact of trade liberalization on the human capital and economic growth by using panel data analysis. Selected Asian countries (India, Indonesia, Japan, Malaysia, Pakistan, Singapore, South Korea and Sri Lanka) have been grouped as lower income countries (India, Indonesia, Pakistan and Sri Lanka) and higher income countries (Japan, Malaysia, Singapore and South Korea) for comparative analysis. The results show that both developed and developing countries enjoy the trade led growth for the selected period. The impact of trade openness on human capital has been found positive for both groups but found significant only for the developed countries due to well-trained human capital. The fruits of trade openness in form of increased productivity of human capital have not been achieved in developing countries due to their less trained and less skilled workers. The investment in human capital is the dire need of the time for the developing countries to enjoy more beneficial effects of trade openness.

*The authors are, respectively, Lecturer of Economics at the University of the Punjab, Lahore-54590; Assistant Professor at Hailey College of Commerce, University of the Punjab, Lahore-54590; and Instructor at the Department of Management Sciences, Virtual University of Pakistan, Lahore (Pakistan).

Corresponding author e-mail: atifkhan_4@yahoo.com

Keywords: Trade liberalization, Human capital, Economic growth, Asian countries, Capital formation

JEL classification: F13, F43, J24

I. INTRODUCTION

The world has become global village and the present era of nations' history is the era of globalization. No country in this age can survive without foreign trade. Countries are liberalizing their trade policies to achieve maximum gains from the opportunities of comparative advantage. Trade openness or liberalization is now considered as one of the primary tools to increase the economic growth. Rich literature is available on the relationship between trade liberalization and economic growth but it has remained contentious among the policy makers due to the empirical results obtained from various studies. The gain from trade liberalization has not been achieved by the developing countries due to protectionist trade policies of the developed nations (Spanu, 2003). But a significant amount of empirical literature has shown the trade led growth for a single developing country analysis, such as analysis of Chaudhry *et al.* (2010) for Pakistan and Utkulu and Özdemir (2004) for Turkey. Easterly and Levine (2001) studied the growth process of sixty four countries and concluded that trade policies regarding openness had affected economic growth positively in these countries.

The empirical literature available on the hypothesis that trade openness affects economic growth positively advocates four main channels; capital accumulation, equality of factor prices among countries, knowledge transfers and technology transfers. Last two channels are related to the human capital of the countries. The countries having better quality and quantity of human capital can enjoy more fruits from trade openness. The more open economy will have larger benefits from trade openness, if country has absorbing capacity of new technology. The impact of trade openness will be limited, if the human capital of the country is not groomed enough to handle new technology due to trade openness. The transmission of knowledge and innovative ideas due to openness of trade increase the quality of human capital. Trade restriction on other hand, hinders transmission process and have negative effect on the human capital.

“Trade liberalization between developed and less developed countries may inhibit learning by doing and therefore the growth of general knowledge in developing countries. Trade liberalization can encourage specialization in product lines, which has not had very much learning by doing in developing

countries” (Young, 1991). According to Young (1991), the human capital needs to be efficient enough to use the knowledge and technology coming from other countries. The impact of human capital on growth is well defined and researched and there exists consensus among researchers that human capital of any country contributes positively towards economic growth. Human capital refers to the skills and abilities of country’s human resources which expand through education, trainings and experiences.

The human capital formation refers to the process of increased education, skills and experiences of the human resources which play a significant role for higher economic growth. The investment in human resources of a country can be defined as human capital formation. It is generally accepted phenomenon that for the sustainable growth a country needs productive resources, technology innovations and handling of new technology. The main resources of country include labour which can be increased with the higher population growth rate; physical capital accumulation which can be increased with higher investment rates and human capital which can be enhanced by investment in human capital. The human capital has to do with both the quantity and quality of the labour force. The countries using human capital effectively are enjoying higher growth rates.

Since, human capital is one of channels of economic growth so the impact of trade liberalization on human capital will be empirically tested in the present study. There is hardly any study according to our knowledge conducted on panel data to check the relationship between trade openness, human capital and economic growth. By using panel data, the present study will take care of the issue that whether trade openness helps countries of Asian region or not. In the present study, we have taken eight countries and have made two groups, *i.e.* high-income countries and low-income countries (according to per capita incomes). The high-income countries include Japan, Singapore, South Korea and Malaysia. The low-income countries include Indonesia, India, Pakistan and Sri Lanka. The reason for choosing these countries is availability of data and reason for making two groups is to draw inferences about the effects of trade openness on economic growth and human capital in developed and developing countries simultaneously.

OBJECTIVES OF THE STUDY

The objectives of the present study are as follows:

1. To check the impact of trade liberalization on the growth and human capital of the lower and high-income Asian economies.

2. To check whether trade openness has indirect link with economic growth due to its impact on human capital in these countries.

II. OVERVIEW OF THE ECONOMIES

DEVELOPED COUNTRIES OVERVIEW

Japan

The economy of Japan is recognized as the second largest among the developed economies, standing next to United States. Japan stood as the fourth largest economy in the world in 2011 based on Purchasing Power Parity. The growth rate of Japan was negative in the year 2008, 2009 and 2011 but in 2012, growth rate of the economy was 4.1% with per capita GDP \$ 37,870. The largest share is from services sector in the GDP which was 74.6% in 2012 with industry share of 24% and agriculture 1.4%. The population of Japan has been growing at an average of 0.0154 since 2005 to 2012.

Japan is the largest investor in international markets. The outward FDI flows from Japan were \$ 114 billion in 2011. Trade was one of the features by which Japan was known in international community, but in 1980's the investment increased so many fold that it had given Japan a new world prominence. In 2010 Japan was the world's fourth exporter of goods and the world's sixth provider of commercial services. The major exports of Japan include motor vehicles, non-electric machinery, consumer electronics and semiconductors, chemical, iron and steel equipment and scientific and optical equipment. The total volume of exports of Japan was \$ 788 billion in 2011. The major imports of Japan include fuel, machinery, food, manufactured goods, chemicals, raw materials and clothing. The total import volume of Japan was \$ 808.4 billion in year 2011 and total trade deficit was standing at \$ 20.4 billion in the same year.

Malaysia

The Malaysian Economy is a fast growing, relatively open and state-oriented economy. The Malaysian economy was ranked 3rd largest economy among the South East Asian countries in 2007. Today Malaysia is one of the world's top countries for offshore manufacturing and service-based operations, therefore, more than 40 countries have invested in over 5,000 Malaysian companies.

Malaysia has had incredible growth in past three decades and achieved 14 continuous years of trade surplus. Free trade zones and technology parks

have also been built for the faster growth of business and research. The major exports of Malaysia include electronic equipment, petroleum and liquefied natural gas, wood and wood products, palm oil, rubber, textile and chemicals. The total export volume of Malaysia during the year 2011 was \$ 212.7 billion. The major imports of Malaysia included electronics, machinery, petroleum products, plastics, vehicles, iron and steel products and chemicals with total import volume of \$ 168 billion in the year 2011.

Singapore

Singapore is one of the most stable economies in macroeconomic terms with no foreign debt, high government revenue and a positive budget surplus. The features like worldwide financial services, business ease, high volume of exports and developed infrastructure have made it a developed country. GDP of Singapore was 239.70 billion US dollars in 2012. The per capita income of Singapore is higher than many of the developed countries. The total population in Singapore was 5.2 million people in 2011, changing 214 percent during the last 50 years. Singapore has enjoyed almost full employment for long periods of time. Singapore has one of the world's lowest unemployment rates at 2.0 percent in 2012. Inflation in Singapore is stable over the last decade or so.

Foreign trade provides most of the revenues to Singapore. Major exports include electronic goods, fuel, chemicals, food, textiles and transport equipment. Main imports of Singapore are fuel, electronic components, machinery, chemicals and manufactured goods. Singapore resident labour force grew by 1.9% in 2012, which was faster than of 1.6% in 2011. With the better health profile, the labour force participation rate of both males and females in working ages of 25- 55 years shows upward trend. The Singapore success story resulted from the good foundations of physical infrastructure. Along with physical capital it is very determined to use human capital as strategy of the future.

South Korea

South Korea over the past four decades has demonstrated incredible growth and global integration to become a high tech industrialized economy. In 1960s GDP per capita was comparable with poor countries of Africa and Asia but currently it is among the world's 20 largest economies. Government promoted the import of raw materials and technology at expense of consumer goods and encouraged saving and investment. During Asian financial crisis of 1997-98 its GDP was struck at 6.9% in 1998 and then recovered by 9% in 1999-2000. Its growth moderated to 4% in 2003 to 2007 and slowed down to

0.3% in 2009 due to global economic downturn in 2008. But in the third quarter of 2009 its economy began to recover due to; export growth, low interest rate and expansionary fiscal policy and attained growth rate of 3.6% in 2011. GDP per capita of South Korea was recorded \$ 16684.21 in 2011. South Korea unemployment rate averaged 3.67% and the present unemployment rate is 2.9%. Korea spends 6% of its GDP on health care and its HDI rank is in world, current literacy rate is 97.9% and education rank is 60. Life expectancy of Korea is 80 years.

South Korea has trade volume of US \$ 558.8 billion which clearly indicates that it is export oriented country. It is 7th largest exporter and 10th largest importer of the world. After 2002, it has made a lot of free trade agreements to increase trade and create good relations with rest of the world. The major exports of South Korea include semiconductors, wireless telecommunications equipment, motor vehicles, computers, steel ships and petrochemicals with total export volume of \$ 558.8 billion. The major imports of South Korea include machinery, electronics and electronic equipment, oil, steel, transport equipment, organic chemicals, plastic with total import volume of \$ 525.2 billion.

DEVELOPING COUNTRIES OVERVIEW

India

India is one of the fast growing Economies of the world since last two decades. Today, Indian economy is considered to be one of the most attractive and influential economy that is growing at a very fast rate. From 1997, the Indian GDP growth rate is very high with the average of 7.8% and even during global recession the growth rate was above 5%. India is considered to be the most attractive destination for investment prospects and business. Since 1991, the government initiated economic reforms that have provided an investor-friendly environment through Liberalization, Privatization and Globalization. In 2010, the Indian economy recoiled strongly from the global financial crisis — in large part because of strong domestic demand — and growth exceeded 8% year-on-year in real terms.

After trade openness India has made remarkable achievement in this context. China, European Union, UAE and USA are major trading partners of India. In terms of export it is nineteenth largest and in terms of imports it is tenth largest. Economic growth rate stood at around 6.5% for the 2011-12 fiscal years. The major exports of the Indian economy include engineering goods, Petroleum products, Chemicals and pharmaceuticals, Gems and jewelers, Textiles and garments, Agricultural products, Iron ore and other

minerals. The major imports of Indian economy include Crude oil and related products, Machinery, Electronic goods, Gold and silver. Trade to GDP ratio was 14.6% in 1990-91 (before trade liberalization) but improved to 32.7% in 2005-06. The major indicator of Indian economy shows that it has gained a lot from trade liberalization, *e.g.* the literacy rate was 48.22% in 1990-91 which has been increased to 64.01% in 2011-12.

Indonesia

Indonesia has the average growth rate of 3.7% for the long time span of 1961-2007. The persistent inflation was one of the major problems of the Indonesian economy. The average inflation rate for Indonesia was 18.8% for the period of 1961-2007. The economy has showed a reduced and control inflation after the year 2000, *i.e.* post-Suharto (President of Indonesia from 1967 to 1998) period. The unemployment rate of the Indonesian economy is 6.2% in 2012 and the average rate for the last decade was 9%. The half of the population is still living below \$ 2 or less a day. The economic growth rate of Indonesian economy grew in last decade but not the development of the economy.

In order to increase trade Indonesia has gained membership of world organizations such as APEC, ASEAN and WTO. The title of chief trading partner and biggest foreign investor in Indonesia goes to Japan. The major exports of Indonesia are oil and gas, electrical appliances, ply wood, textiles and rubber. The major imports of Indonesia are machinery and equipment, chemicals, fuels and foodstuffs. Total trade volume of Indonesia was \$ 26061 million in the year 2011. The Indonesian economy has not gain much fruits from trade liberalization for the human capital as its investment in human capital have been inadequate, producing an education system that is lagging behind economic development.

Pakistan

Pakistan economy is 27th largest in nominal terms and 47th largest in Purchasing Power Parity terms in the world. Pakistan has been known as agriculture country but the transition towards industry made it as a semi-industrial economy. The economy of Pakistan mainly encompasses of textile, food processing, chemical, agriculture and other industries. The country has witnessed a number of domestic and external shocks from 2007 onwards. Two floods, bad law and order situation and the energy crisis have badly hampered the economic growth. During the last few decades, Pakistan economy is passing through the phase of structural transformation like other developing countries.

In 1980s, Pakistan restricted trade by applying high tariff rates and non-tariff barriers. In a result of that imports were far away from local market. But in 1990s Pakistan has adopted the liberalization policy for trade and financial sector due to structural adjustment programmes. Pakistan followed liberalization policy for its trade as well as financial sector. The major exports of Pakistan include cotton goods, leather and rice. The share of textile exports has been fallen in last decade or so. The share of this sector was above 65% in total exports of Pakistan which has been reduced to 52% in 2010-11 due to persistent energy shortage. The total export volume of Pakistan is \$ 29.75 billion in the financial year 2011. The major imports of Pakistan include fuel, machinery and transport equipment. The total import volume of Pakistan is \$ 40.42 billion in the financial year 2011.

Sri Lanka

Sri Lanka is a mixed economy engaging both private and public sector in the production process. It highly encourages the foreign investment and has established several free zones. Its services sector is growing at very fast rate and it has one of the well-developed banking systems which comprises of both local and foreign banks. Sri Lanka has a free market ideology and has one of the most liberal foreign trade regimes in the world. The average GDP growth of the economy for the last decade is 6% with per capita income of \$ 5600 and unemployment rate at 4.2% in 2011. A Global Survey carried out by the 'Equity and Bond Trading Institution' has chosen Sri Lanka as the 4th rapidly developing economy in the world.

Sri Lanka has a high literacy rate of 91%, a trainable workforce with a good command of the English language and a large pool of engineers. Sri Lanka has one of the leading health care systems among developing countries, in terms of access and outreach. The average life expectancy at birth is 91.2. The Sri Lankan economy liberalized in 1977 and shifted towards a free market economy adopting the export-oriented and private investment policies. Sri Lanka has signed Free Trade Agreement (FTA) with India and Pakistan in December 1998. A Bilateral trade agreement has been signed between Sri Lanka and Vietnam.

Major exports of the economy include textiles and apparel, tea and spices, rubber manufactures, precious stones, coconut products and fish with export volume of \$ 13,644 million. The major imports of Sri Lanka include petroleum, machinery, transportation equipment building materials, mineral products, foodstuffs and textiles with total import volume of \$ 22,256 million (2011). The total trade deficit became \$ 8611 million in 2011.

III. LITERATURE REVIEW

Söderbom and Teal (2003) has examined the hypothesis that higher level of human capital and more openness or trade of an economy leads to higher productivity growth. To examine the research question 93 counties were taken and time interval for the estimation was from 1970-2000. Fixed effect models were used to obtain the results. The results has highlighted that technical progress will be 0.8% if openness level is doubled. The effect of human capital on the income is significant but no significant effect was observed on the productivity growth.

Krebs *et al.* (2005) empirically estimated the relationship between trade liberalization (trade policy) and risk to the income of individuals for Mexico. They have further examined to what extent trade policy has affected the workers income having different human capital. The education of workers was taken as the proxy of human capital. The data on various manufacturing sectors were taken and the range of data was from 1987 to 1998. The simple regression analysis was used to carry out results. The results of the study have suggested that the openness of trade in Mexico has not link with income risks. Further, the reforms in trade policy have not affected the risk of the income of individual having either low or higher levels of human capital. The individuals having intermediate human capital has experienced an increase in income risk due to trade policy of Mexico.

Utkulu and Özdemir (2004) empirically examined the impact of trade openness on the economic growth and per capita income of Turkey. The data has been used of large range, *i.e.* from 1950 to 2000 to obtain results. The Johansen's Cointegration and Error Correction Model (ECM) were used to test the relationship between trade openness and economic growth. Physical capital and human capital (measured in secondary school enrolment rate) were taken as control variables with trade openness as main variable. The results showed significant impact of trade openness on economic growth as trade policy affected economic growth of Turkey both in short-run and in long-run. Further, all three exogenous variables, trade openness; physical capital and human capital were causing the economic growth of Turkey for the selected period.

Hasan and Butt (2008) empirically examined the effect of trade, labour force, education and debt on the economic growth of Pakistan. The data range for the study was taken from 1975 to 2005. The Auto Regressive Distributed Lag (ARDL) approach was applied to obtain the estimates. The result revealed labour force of Pakistan and education was contributing positively towards the economic growth of Pakistan. One percent increase in

the level of labour force yielded 2.85% increase in the economic growth in the long-run.

Herath (2008) examined to what extent the trade liberalization had affected the economy of Sri Lanka. The author had taken data range from 1960 to 2007. Data had been divided it into two parts, *i.e.* from 1960 to 1976 (before trade liberalization) and from 1977 to 2007 (after trade liberalization). Regression analyses were used by the author to check the degree of relationships among variables and Chow test was applied to test the structural changes in the economy. The results showed a positive effect of trade liberalization on economic growth and results of chow test showed more increase in economic growth after trade liberalization.

Chaudhry *et al.* (2010) checked the relationship between human capital, trade openness and economic growth of Pakistan. The authors checked the causal relationship between the above stated three variables by using Granger Causality. The short-run and long-run relationship of three variables had been checked by applying Johansen's cointegration and Vector Error Correction Model. Time series data of range 1972 to 2007 was used to obtain the results. The results suggested a positive and significant relation between trade openness and economic growth for the selected period of study. Same relation was obtained for the human capital and economic growth. Export led growth hypothesis were also proved as trade openness and labour force were having significant effect on economic growth. A unidirectional causality was found running from trade openness to economic growth.

Lai (2010) examined the impact of trade liberalization on the human capital for forty one developing countries from different regions of the world. The data used in the study was ranged from 1980 to 2002. The author had taken net secondary school enrollment as proxy of human capital in the study. Variables like income, liberalization date and public expenditure were taken as control variables for the model. The authors divided the countries into two groups, *i.e.* countries having high literacy rate and low literacy rates to check the effects of trade liberalization on the human capital. The author highlighted the differential of human capital quality and quantity among countries in order to understand the post liberalization recital. The results of the study showed that trade openness increased human capital formation more in countries having high literacy rate than the countries having relatively low literacy rate.

Effiom *et al.* (2011) have empirically examined how trade openness or trade liberalization has affected the economy of Nigeria. Two separate models were developed to check the impact of trade openness on the

economic growth and human capital. Two separate proxies were used for the human capital, *i.e.* expenditure on education and literacy rate. Time series data was used for the study having range from 1970 to 2008. Vector Auto-Regression and Co integration analysis was used to carry out results. The results of the study showed that trade liberalization of Nigerian economy had no statistically significant effect on the human capital when expenditure on education was taken as proxy of human capital. But results were totally opposite when literacy rate was taken as proxy for human capital. The trade liberalization was found to be positively affecting growth of Nigeria.

Maksymenko and Rabbani (2011) examined the impact of human capital accumulation and economic reform (trade reforms) on the post-reform economic growth of Indian and South Korean economies. The data range for the South Korea was taken from 1966 to 1977 and for India it was from 1992 to 2003. Estimates were obtained by applying multivariate maximum likelihood co integration. The human capital positively and significantly contributed to the economic growth of both countries. The effect of reforms was significant and positive for the case of South Korea but for India it was negative and small.

Manni and Afzal (2012) empirically tested the effect of trade liberalization on the economic growth of Bangladesh economy. Simple Ordinary Least Square (OLS) was applied to check the effect of trade liberalization on the economic growth for the period 1980 to 2010. The result of the study showed that trade liberalization had positively contributed towards the economic growth of Bangladesh. The liberalization has not affected the inflation in the country but both real imports and exports had been increased in the above stated period.

The past literature on relationship between trade openness, human capital and growth is only available on time series data. The past literature suggests that trade liberalization affects human capital of a country which ultimately contributes positively towards economic growth. There is need for comparative analysis of different income group countries to check the effects of trade liberalization on the human capital and economic growth by using panel data analysis.

IV. DATA SOURCES AND METHODOLOGY

The data range for the present study is from 1981 to 2012. The data for the selected countries has been taken from World Development Indicators WDI CD ROM. Panel data has been used in this study and the availability of the whole data on each variable may not be seen all the time. In this study as

well unavailable values of the data are missing which make unbalanced spaced panel.

Model Specification

The first model has been designed to check the impact of trade liberalization on the human capital. Here human capital has been taken as dependent variable and Trade Openness (Trade liberalization) has been taken as explanatory variable. Control variables such as dependency ratio and per capita income have been incorporated in the model.

$$HC_{it} = f(OP_{it}, DEP_{it}, PCY_{it})$$

The model can be written in equation form as:

$$HC_{it} = \beta_0 + \beta_1 OP_{it} + \beta_2 DEP_{it} + \beta_3 PCY_{it} + \varepsilon_t$$

Where

HC_{it} = Human capital

OP_{it} = Trade liberalization

DEP_{it} = Dependency ratio

PCY_{it} = Per capita income

ε_t = Random disturbance term

i = Cross section dimension of the variable

t = Time series dimension of the variable

Human capital has been taken as dependent variable in this model. Secondary school enrolment has been taken as proxy of human capital. The trade openness here is calculated by taking ratio of trade volume (imports + exports) of countries to the level of Gross Domestic Product (GDP). The trade openness is expected to have positive relation with human capital as shown by Lai (2010). The high dependency ratio reduces the investment in human capital as most of the resources will be diverted to the consumption goods and services. The higher level of per capita income leads to higher better quality of human capital so expected relation is positive between per capita income and human capital as shown by Effiom *et al.* (2011).

Second model has been designed to check the direct impact of trade liberalization on the economic growth. The human capital has also been incorporated in the model to check its impact on growth as it is affected by trade liberalization. Labour and capital are considered as basic ingredients of economic growth are also incorporated in the model as explained variables.

$$Y_{it} = f(K_{it}, L_{it}, HC_{it}, OP_{it})$$

The model can be written in equation form as:

$$Y_{it} = \beta_0 + \beta_1 K_{it} + \beta_2 L_{it} + \beta_3 HC_{it} + \beta_4 OP_{it} + \varepsilon_t$$

Where

- Y_{it} = Growth Rates
- K_{it} = Gross Capital Formation
- L_{it} = Labour Force

In the above model growth rate of the economies has been taken as dependent variable. Capital stock and labour are considered as essential components of growth as explained in endogenous growth theory (New Growth Theory). The gross capital formation has been taken as a proxy of capital. The expected relation of economic growth with these two variables is positive. Human capital is also considered as one of the main drivers of growth in any economy so its sign is expected to be positive. More open economy leads to higher level of growth as shown by Chaudhry *et al.* (2010). The effect of trade openness on economic growth is expected to be positive.

Fixed Effect Model

Fixed Effect Model has been used in the present study to examine the impact of explanatory variables on the explained variable within entity (countries). Fixed effect model has been applied because it assumes that some factors within country (identity) may influence the dependent variable and we are not sure that each country in the present study may or may not have significant effect on the dependent variable. The estimates of the fixed effect shows constant slope and different intercepts for cross section units. The equation for the fixed effect model is written as:

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

Where

- Y_{it} = Dependent variable
- α_i = Intercept for each country
- β = Coefficient for each independent variable
- X_{it} = Independent variables
- ε_{it} = Error term

The fixed effect model estimation uses dummy variable for time invariant variables and F test can be used to check the significance of these dummy variables. The null hypothesis which states that except one dropped

dummy (μ), all others dummies are equal to zero. The test statistics for F test are as under:

$$H_0: \mu_1 = \mu_2 = \mu_3 \dots \mu_{N-1} = 0$$

$$F = \frac{\left(\frac{RRSS - URSS}{N - 1} \right)}{\left(\frac{URSS}{NT - N - K} \right)}$$

If the null hypothesis is rejected then it provides the base to use fixed effect model as it will be consistent and efficient.

V. ESTIMATION RESULTS AND FINDINGS

The results have been found by applying fixed effect estimation to control the country specific differences in the panel data. Table 1 represents the results of the equation one in which effect of trade liberalization has been checked on the human capital.

TABLE 1
Effect of Trade Liberalization on Human Capital

Variables	Dependent Variable Human Capital	
	Developed Countries	Developing Countries
T	0.05729 (3.23)*	0.08111 (1.48)
AD	-0.53171 (-6.63)*	-0.61695 (-7.43)*
GDPPC	0.00025 (4.58)*	0.01090 (7.63)*
C	104.0562 (19.61)*	77.60418 (9.97)*
R^2	0.6677	0.8750
Obs.	88	92
F-stat	54.91	198.30

NOTE: * shows significance of the variable at 1% and ** shows at 5% ** and *** shows at 10%.

In first equation, secondary school enrolment has been used as proxy of human capital as a dependent variable. The results depicts that the impact of trade openness on the human capital in both developed and developing countries is positive but only significant for the developed countries at one percent level. The positive and significant relation has also been proved by Effiom *et al.* (2011). The results show one percent increase in the trade to

GDP ratio will leads to 0.05 percent increase in the school enrolment in the developed countries. The age dependency ratio has negatively and significantly affected the human capital of both the developed and developing countries at one percent level. The effect is little more in the developing countries, having coefficient 0.65 shows one percent increases in the dependency ratio leads to 0.65 percent decrease in the human capital of the developing countries. The results show that GDP per capita income in both developed and developing countries contribute positively and significantly as showed by Baldacci *et al.* (2004) and Al-Samarrai (2006).

The value of R^2 is 0.66 for developed countries and 0.87 for developing countries, which reflect that 66 percent and 87 percent variation in the dependent variable are explained by the independent variables. The F test rejects the null hypothesis which states that country effects are not very important. Countries dummies are jointly significant at 1 percent level in both groups of the countries suggests that country effects are not important in both groups.

Developing Countries Hausman Test

Test	Value	P-value
Model 1	13.43	0.00*
Model 2	34.57	0.00*

NOTE: * shows significance of the variable at 1%.

Hausman test has been applied to check whether fixed effect model or random effect model is appropriate for the selected data. The null hypothesis of the test is that the preferred model is random effect model. The rejection of null hypothesis concludes that the fixed effect model is appropriate.

TABLE 2

Residual Diagnostic of Fixed Effect Model

Test	Value	Value	P-value	P-value
	Model 1 (Developing Countries)	Model 1 (Developed Countries)	Model 1 (Developing Countries)	Model 1 (Developed Countries)
Heteroskedasticity	27.62	9.38	0.000	0.020
Contemporaneous Correlation	2.06	-1.09	0.060	0.270
Autocorrelation	1.97	2.93	0.210	0.049

Table 2 provides information on residual diagnostic of fixed effect model. Heteroskedasticity normally exists in pooled data for which modified Wald test for group wise has been applied. Rejection of the null hypothesis in both groups, *i.e.* developed and developing countries, indicates the presence of heteroskedasticity in the data. To remove the problem and to correct the standard errors “robust” command in STATA has been applied which corrects error and removes the issue of heteroskedasticity.

Contemporaneous correlation is considered a crucial element in panel modeling. Fundamentally, it gauges the correlation across entities in fixed effect modeling. Absence of contemporaneous correlation in fixed and random effect models declares unbiased result. In this context, Pesaran’s test has been applied on all models. We have been unable to reject null hypothesis at 5% conventional level. It means cross sections in the study are independent. Wooldridge test of serial correlation has been applied to check serial correlation of residual in fixed effect model. This test provides better result in long panel where: Time period of pool > number of entities. In the present case, we can’t reject null hypothesis of Wooldridge test which means there is no serial correlation in above models.

TABLE 3
Effect of Trade Liberalization on Economic Growth

Variables	Dependent Variable Economic Growth	
	Developed Countries	Developing Countries
T	0.01944 (1.64)***	0.04907 (2.03)**
LF	-0.24921 (-1.64)	-0.38334 (-2.55)*
GCF	0.41519 (2.26)**	0.08362 (3.665)*
SSE	0.23452 (4.33)*	0.08327 (1.98)**
C	11.01682 (1.10)	22.2394 (3.18)*
R^2	0.1951	0.2374
Obs	124	92
F-stat	5.18	6.54

NOTE: * shows significance of the variable at 1% and ** shows at 5% ** and *** shows at 10%.

The effect of trade liberalization on the economic growth has been showed in Table 3. The trade liberalization has positive and significant effect on the economic growth of both selected developed and developing countries. The results suggest that one percent increase in trade liberalization will leads to 0.05 percent increase in GDP growth for the developing

countries and 0.02 percent for the developed countries. The same results have been proved by Bahmani-Oskooee and Niroomand (1999) and Mercan *et al.* (2013) in their panel data analysis. The labour force coefficient has been found negative and significant for the developing countries at one percent level of significance and has been found insignificant for the developed countries. The negative and significant effect of labour force on economic growth has been observed for the developing countries due to highly unemployment rates in the selected countries where labour force quantum is much higher than the capacity of the economy.

Gross capital formation growth rate (GCF) has been found positive and significant at 1 percent and 5 percent level of significance for developing and developed countries respectively. Positive and significant relation of gross capital formation and economic growth has been proved by Fayissa and Nsiah (2010). The coefficient of GCF is far higher in developed countries due to the quality of capital in these countries. Secondary school enrolment has been taken as a proxy of human capital which has been contributing positively and significantly for both groups as proved by Lai (2010). The F test results depicts that country effects are not very important and fixed effect estimation is suitable.

Developed Countries Hausman Test

Test	Value	P-value
Model 1	96.68	0.00*
Model 2	21.29	0.00*

NOTE: * shows significance of the variable at 1%.

As the null hypothesis of the Hausman test is that the preferred model is random effect model (Green, 2008). The rejection of null hypothesis concludes that the fixed effect model is appropriate.

TABLE 4

Residual Diagnostic of Fixed Effect Model

Test	Value	Value	P-value	P-value
	Model 1 (Developing countries)	Model 1 (Developed Countries)	Model 1 (Developing countries)	Model 1 (Developed Countries)
Heteroscedasticity	6.93	15.49	0.130	0.052
Contemporaneous Correlation	1.49	2.68	0.130	0.042
Autocorrelation	0.04	22.72	0.840	0.054

Table 4 provides information on residual diagnostic of fixed effect model. Modified Wald test of group wise has been applied. Failure of rejection of the null hypothesis in both groups indicates the absence of heteroskedasticity in the data.

Contemporaneous correlation is considered a crucial element in panel modeling. Absence of Contemporaneous correlation in fixed and random effect models declares unbiased result. Pesaran's test has been applied on all models. We have been unable to reject null hypothesis at 5% conventional level. It means cross sections in the study are independent. Wooldridge test of Serial correlation has been applied to check serial correlation of residual in fixed effect model. This test provides better result in long panel where: Time period of pool > number of entities. In present case, we can't reject null hypothesis of Wooldridge test which means there is no serial correlation in above models.

VI. CONCLUSION

The role of trade openness in the course of economic growth has been a trade mark research question in last few decades. The proponents of positive effects of trade openness on economic growth advocate four main channels; capital accumulation, equality of factor prices among countries, knowledge transfers and technology transfers through which trade openness helps to increase economic growth. The fruits of openness of trade can be achieved with efficient human capital. Most of the empirical literature has tested the direct link between openness and growth. The present study fulfilled the gap in literature by verifying the positive impact of trade openness on human capital in panel data analysis, which has not been tested in literature according to best of our knowledge.

The results show that both developed and developing groups of the countries enjoyed the trade led growth for the selected period. The impact of trade openness on human capital has been positive for both groups but significant only for the developed countries due to well-trained human capital. The fruits of the trade openness to increase the productivity of human capital have not been achieved in developing countries due to less groomed and less skilled workers. The investment in human capital is the dire need of the time for the developing countries to enjoy more beneficial effects of trade openness.

REFERENCES

- Al-Samarrai, S. (2006), Achieving education for all: How much does money matter? *Journal of International Development*, Volume 18(2), pp. 179-206.
<http://dx.doi.org/10.1002/jid.1190>
- Bahmani-Oskooee, M. and F. Niroomand (1999), Openness and economic growth: An empirical investigation. *Applied Economics Letters*, Volume 6(9), pp. 557-561. <http://dx.doi.org/10.1080/135048599352592>
- Baldacci, E., B. Clements, S. Gupta and Q. Cui (2004), Social spending, human capital, and growth in developing countries: Implications for achieving the MDGs. *IMF Working Paper # WP/04/217*, Washington DC.
- Chaudhry, I. S., A. Malik and M. Z. Faridi (2010), Exploring the causality relationship between trade liberalization, human capital and economic growth: Empirical evidence from Pakistan. *Journal of Economics and International Finance*, Volume 2(8), pp. 175-182.
- Easterly, W. and R. Levine (2001), What have we learned from a decade of empirical research on growth? It's not factor accumulation: Stylized facts and growth models. *World Bank Economic Review*, Volume 15(2), pp. 177-219.
<http://dx.doi.org/10.1093/wber/15.2.177>
- Effiom, L., U. P. Samuel, E. O. Okon and E. E. Itam (2011), Trade liberalization and human capital in Nigeria: A vector autoregressive analysis. *European Journal of Economics, Finance and Administrative Sciences*, Volume 40, pp. 154-168.
- Fayissa, B. and C. Nsiah (2010), The impact of remittances on economic growth and development in Africa. *The American Economist*, Volume 55, No. 2 (Fall), pp. 92-103. <http://www.jstor.org/stable/41429198>
- Hasan, A. and S. Butt (2008), Role of trade, external debt, labor force and education in economic growth: Empirical evidence from Pakistan by using ARDL approach. *European Journal of Scientific Research*, Volume 20(4), pp. 852-862.
- Herath, H. M. S. P. (2008), Impact of trade liberalization on economic growth of Sri Lanka: An econometric investigation.
- Krebs, T., P. Krishna and W. Maloney (2005), Human capital, trade liberalization and income risk. In *Defense of Globalization: Prospects and Problems*. University of Florida, Gainesville, January 29-31.
- Lai, C. W. (2010), Trade liberalization and human capital formation in developing countries. Hong Kong Baptist University, Kowloon Tung, Hong Kong.

- Maksymenko, S. and M. Rabbani (2011), Economic reforms, human capital, and economic growth in India and South Korea: A cointegration analysis. *Journal of Economic Development*, Volume 36(2), pp. 39-59.
- Manni, U. H. and M. N. Afzal (2012), Effect of trade liberalization on economic growth of developing countries: A case of Bangladesh economy. *Journal of Business, Economics and Finance*, Volume 1(2), pp. 37-44.
- Mercan, M., I. Gocer, S. Bulut and M. Dam (2013), The effect of openness on economic growth for BRIC-T countries: Panel data analysis. *Eurasian Journal of Business and Economics*, Volume 6(11), pp. 1-14.
- Pesaran, M. H. (2004), General diagnostic tests for cross section dependence in panels. *Cambridge Working Papers in Economics* # 0435, Faculty of Economics, University of Cambridge.
- Söderbom, M. and F. Teal (2003), Openness and human capital as sources of productivity growth: An empirical investigation. EconWPA series Development and Comp Systems No. 0409031.
- Spanu, V. (2003), Liberalization of the international trade and economic growth: Implications for both developed and developing countries.
- Utkulu, U. and D. Özdemir (2004), Does trade liberalization cause a long run economic growth in Turkey? *Economics of Planning*, Volume 37(3-4), pp. 245-266. <http://dx.doi.org/10.1007/s10644-005-8080-8>
- Young, A. (1991). Learning by doing and the dynamic effects of international trade. *The Quarterly Journal of Economics*, Volume 106(2), pp. 369-405. <http://dx.doi.org/10.2307/2937942>