Pakistan Journal of Commerce and Social Sciences
2019, Vol. 13 (4), 1041-1056
Pak J Commer Soc Sci

How Do Trade Openness and Public Expenditures Affect Health Status in OIC Member Countries? An Empirical Analysis

Fatima Farooq
Putra Business School, Universiti Putra Malaysia
Email: fatima@putrabs.edu.my

Zulkornain Yusop
Putra Business School, Universiti Putra Malaysia
Email: zulkornain@putrabs.edu.my

Imran Sharif Chaudhry
School of Economics, Bahauddin Zakariya University Multan, Pakistan
Email: imran@bzu.edu.pk

Abstract

This paper investigates the impact of trade openness and public expenditures on health status in OIC member countries. Panel data of 47 OIC member countries from 1991 to 2017 is taken from the World Development Indicators (WDI). The econometric results are estimated using GMM technique to avoid the endogeneity issue in panel data analysis. The results reveal that trade openness, public health expenditures, public education expenditures and economic growth are positively and significantly correlated with life expectancy in overall OIC countries and high income OIC countries. GDP is negatively and significantly correlated with life expectancy in low income OIC countries. Trade openness, public health expenditures, public education expenditures and GDP are negatively and significantly correlated with infant mortality rate in overall OIC countries and high income OIC countries. GDP has positively and significantly correlated with infant mortality rate in low income OIC countries.

Keywords: trade openness, public health expenditure, public education expenditure, GDP, life expectancy, infant mortality rate, OIC countries.

1. Introduction

Generally, it is believed that if a person has good health, he will definitely be more productive and efficient towards economic activities. Labor health services will enhance the productivity and as a result the earning of workers will also be increased, whereas the poor health with the presence of disease will slow down the productivity of worker which is responsible for a decline in worker earning and economic growth of a country (Odior, 2011). The importance of health care can be realized through the fact that it is likely to

bring one-third increase in GDP growth that reinforce to improve human capital (Bloom et al., 2004).

Unfortunately, the status of health is not very good in Muslim majority countries known as OIC countries. According to annual health report OIC 2017,OIC countries distributed only 4.6% of their GDP for health expenditure which is a very low share as compared to other non-OIC countries who allocated 6.2% of their GDPs whereas in case of global and developed countries the share of health expenditure of their GDPs is 9.9% and 12.6% correspondingly (Ministry of Iraqi Health, 2017). While talking about the contribution on health expenditures out of their total government expenditures they consumed only 8.9%

OIC countries are also suffering from food insecurity according to OIC health report (2017), 18% people of the total population are undernourished. This situation is worse in south Asian countries where 25% of total population around 84 million people in absolute term are undernourished (Ministry of Iraqi Health, 2017). According to the survey of Food and agricultural organization (FAO, 2012), there are 31 OIC countries reported as low Income Food Deficit Countries (LIFDC). These countries are dependent on food aid and imports to fulfill their needs of local food demands (FAO, 2019).

The steering committee of the organization of Islamic cooperation on Health demands for the execution of expenditure on health by suggesting a plan for the Strategic Health Program of Action (SHPA), 2014-2023. OIC steering Committee also stressed on the improvement of health situation in member states and to work hard to mobilize governments, international organizations, and other stakeholders to participate in the implementation of OIC- SHPA. On these grounds it becomes an urgent need of OIC countries to liberalize their trade and enhance the public expenditure share on health and education to promote good standards of human capital.

Trade openness is an important indicator of globalization that is known to be a driver of productivity growth, human capital accumulation and human development. Trade is capable to change the structure and growth rate of the economy. Increasing trend in growth rate has an ability to increase employment of factors of production; labor & capital which in turn increase per capita income (UNDP, 2006). Through these channels it is also responsible to affect public health in either way positive or negative.

Trade liberalization can benefit poor in different ways such as by lowering the prices of consumer goods specially food items, increasing the income of agricultural producers commonly belong to developing countries and by increasing the demand of skilled labor which in turn increases the demand for education and public goods. Hence it is pretty reasonable to say that trade openness is good for poor and good for health (Dollar & Kraay, 2002) . More openness to trade leads to lower infant mortalities and increase life expectancies in developing countries (Owen & Wu, 2007).Although growth is also responsible to increase inequality, but this effect is offset by positive implications of trade liberalization (Ravallion, 2004). Trade openness is considered for rising living standards in the world (Dollar & Kraay, 2004).

The World Trade Organization (WTO), is responsible for setting the new rules to lead the world trade. It was established to promote free trade and to restrict the imports of such products which are not good for public health. The General Agreement on Tariffs and Trade restructured during the Uruguay Round of trade discussions, can affect the

international flow of health goods or products by allowing countries to ban the imports of products to protect public health as well as it make policies to liberalize trade to grab the benefits of free trade.

Policies to promote trade openness supports in achieving the high growth and human development in Asian economies (Mustafa, Rizov, & Kernohan, 2017). Globalization increases economic growth which in turn increases the quality of health of people (Huynen et al., 2005). It can also benefit the world by providing essential drugs, vaccination plans and other low cast precautionary measures and therefore broaden the effectiveness of health sector (Woodward et al., 1999).

Other than trade openness, public expenditure also plays a vital role for increasing the good standard of health. Public expenditures and Trade openness are also interlinked. Most of the literature supports the positive linkage of public expenditure and trade openness (de Mendonça and Cacicedo, 2015). Developing nations demand increase in its government expenditure pattern in case of trade openness to compensate the external (De Mendonça & De Oliveiria, 2019). While some argue there is no causality between openness and government size (Benarroch & Panday, 2012).

Keeping in view the importance of health, the present study is a modest effort to investigate the role played by trade liberalization and public expenditures to affect public health with special reference to OIC member countries because the combined effect of trade openness and public expenditures on health is not yet studied in these Muslim countries.

How do trade openness and public expenditure spur health in OIC countries is the main objective of this study. Health status is conservatively measured by life expectancy at birth, and by child and infant mortality. The present study can be considered to prove good contribution to the existing literature.

The paper is arranged as follows. Section 2 highlights the review of the related literature whereas Section 3 concentrates on model specification and research methodology. Section 4 presents empirical results and discussions. Lastly, concluding remarks and policy suggestions are provided in section 5.

2. Review of Literature

2.1 Link between Globalization and Health

There are number of studies that conceptually visualize the linkages between globalization especially economic globalization and health.one of the pioneer study of Romer (1989) explained how globalization enhances knowledge which is necessary to augment productivity and economic growth. High economic growth is associated with high level of household income and thus better health facilities. It is quite reasonable to say that globalization affects health system indirectly. The significant role of globalization in promoting health through information and communication technologies (ICT) is analyzed by (Abbott & Coenen, 2008).

The theoretically connection between globalization and health in five different ways with special attention to economic globalization has been established (Woodward et al., 2001). They claimed that globalization affects health directly and indirectly. The former includes

effects like impact of WTO and GATS on health and policies which are directly operated, impact of GATS on human health in the form of infectious diseases and prices of drugs, whereas indirect effects involve the impact of trade openness on health through the presence of national income such as availability of resources and public expenditures made on health, level of nutrition and living condition depending on household income. Similarly, in the literature, we also find strong evidence that globalization is pretty likely to increase life expectancy (Bergh and Nilsson, 2010).

In the present study, we are interested to focus more on specific consequences of liberalization or globalization on health. Trade openness is a part of globalization.

Trade can affect health through various set of channels. Economic globalization or trade openness is envisioned as an important determinant of health as other determinants like social, cultural institutional and environmental globalization does. Economic globalization can affect health through economic Infrastructure (tax system, markets, occupational structure) and economic development (income, trade in goods and services, economic equity)(Huynen et al., 2005).(Blouin et al., 2009) also studied the degree of association between health and trade openness through five important determinants namely income, inequality, unhealthy diets and economic insecurity. They concluded that Trade openness increases income that in return enhance the quality of health, this result is more important in case of low-income countries as compare to high income countries because poor countries required to meet their basic needs and improve their quality of life. Whereas talking about negative perspective of trade openness it increases the level of remaining three factors such as, inequality in wage differential, economic insecurity and unhealthy diet pattern which destroy the health of people by reducing life expectancy and increasing child mortality.

Hamid and Amin (2013) tried to investigate the linkage between human development and trade openness in OIC countries. By looking at longevity, literacy and educational attainment they inquired either trade openness affects human development with or without income component. Trade openness was observed to be affecting human development positively and significantly only through income channels. Same results are found to be supported by few more researchers who claimed that trade openness leads to improve health by increasing life expectancy and reducing infant mortality (Owen and Wu, 2007;Herzer, 2017). Levine & Rothman (2006) in their study acknowledged that trade openness is helpful in reducing infant mortality, child mortality and malnutrition. Likewise Trade openness and foreign direct investment improves public health by increasing life expectancy in developing countries like Pakistan (Alam et al., 2016).

Although trade openness is considered to be a facilitator to improve health but its consequences are also not free from ambiguity. Few studies also presented its negative impact on health and stated that it can cause infant mortality to increase (Pham, 2016), spread of infectious diseases (Kawachi and Wamala, 2006), negative impact on environment that cause poor health conditions (Owen and Wu 2007) and through promoting income inequality which adversely affects public health (Dreher & Gaston, 2008; Bergh and Nilsson 2008).

There is a causality between globalization and health. As globalization is a source to improve health conditions, similarly health and healthy people are also essential to

promote trade liberalization. Good health will result in more productivity and enables the economy to compete in international market through creating the attraction for investment. But if the human capital is poor due to ill health its performance will reduce resulting in low productivity. The health is not only responsible to increase poverty level and reduce wellbeing of people as well as it also distracts the advantages of globalization away from the economy. This condition is more severe in low income countries (Woodward et al., 1999).

2.2 Public Expenditure and Health

Indeed, a substantial body of the literature has highlighted public expenditure as a driver of improving health by increasing life expectancy and reducing infant mortality rates.

The study of Swaroop and Rajkumar (2002) explored the relationship between public expenditure and health and found that in countries where there is good governance in form of low corruption and quality of bureaucracy, if public expenditures on health increased it can significantly lower down the infant mortality rate. The dynamic direct and indirect impact of public expenditure on health and economic growth was also analyzed by (Odior, 2011) for the case of Nigeria. This study revealed that greater public expenditures yields to better health and fasten economic growth so it is suggested that Sub Saharan African countries should transform their government expenditures from other sectors towards health sector. Another research done by (Edeme, 2017) in Nigeria unveiled the linkage of public expenditure with health outcome and health taken as life expectancy at birth and infant mortality rate.it was observed that public expenditure made on health improves life expectancy and reduce infant mortality rate. Same results can be seen in literature for developed countries where public health expenditures are negatively related to infant mortality rate and positively associated to life expectancy at birth in 17 OECD countries (Kim and Lane, 2013). In the same way, Novignon, Olakojo, & Nonvignon (2012) also found public health expenditure as an indicator to improve life expectancy and decrease infant mortality in Sub Saharan African countries.

2.3 Health Care Expenditure and Growth

There are also number of studies that urge the importance of health care expenditure for Economic growth and explored positive link between these two (Hartwing, 2008) while few researchers are also with a view that there is no strong link between health expenditure and growth except reducing mortality rate and promoting human capital (Karim, 2016) and no evidence found that support health care expenditure as a foster of long term economic growth (Mehrara & Musai, 2011)

The relation between public expenditure and healthcare is less studied in OIC countries as Muslim countries are not so rich in human capital and welfare of people. For the economic growth and wellbeing of OIC countries healthcare expenditure, education expenditure and technology emerged to be important indicators because they have long run co-integrated relationship with economic growths of OIC countries (Kefeli & Hashim, 2018).

Therefore, it is concluded that there is no significant study which analyzed the impact of trade openness and government expenditure together on health status in OIC member

countries. Therefore, this study fills the gap in literature for determining health status using trade and government expenditures in Muslim countries.

3. Methodological Issues, Data Sources and Construction of Models

There has been observed in the previous studies conducted by Novignon & Atakorah, 2016, Bergh & Nilsson, 2010 and Owen & Wu, 2007 that health is intensively influenced by trade regimes. Some studies like Owen and Wu (2007) expanded that life expectancy is directly linked and infant mortality rate is negatively linked with trade openness while in some other studies like Popkin (2006), it is perceived that open trade is having inversely linkage with life expectancy and positively with infant mortality. But in this study, the indicators of health status are life expectancy and infant mortality rate and focus is directed towards establishing the linkage between health indicators by considering trade openness and government expenditure and this idea is already somehow given by Bergh and Nilsson (2010).

The functional form is given as follows.

Health=f (Trade Openness $_t$, Public Expenditures $_t$, Other control Variables $_t$)

In various earlier studies like Lynch et al. (1998), Pamuk et al. (2011) Grossman (1972) and Qadir and Majeed (2018), the linkage of Income, Per Capita gross national income with Health indicators have been observed. So, this study also considers GDP, public expenditures including government expenditures as control variable as in many earlier studies highlighted above. So following model is presented by adding all variables in which Food production index (FPI) is used as a proxy for food availability.

$lexp_{it}=\beta_0+\beta_1 lexp_{it-1}+\beta_2 lnopen_{it}+\beta_3 lnhexp_{it}+\beta_4 lneexp_{it}+\lambda Z_{it}+\varepsilon_{it}$……...model 1

Here,

lexp= life expectancy

$lexp_{it-1}$ = lagged level of life expectancy

lnopen = log of trade openness. Trade openness is measured by exports plus imports divided by GDP.

lnhexp= log of public health expenditures

lneexp= log of public education expenditures

Zit = vector of control variables, which includes GDP and food availability which is proxied by food production index (FPI).

The interaction term of public health expenditures and public education expenditures has been included to measure the combined effect of health and education expenditures on life expectancy. So a new model is developed by including above interaction term:

$lexp_{it}=\beta_0+\beta_1 lexp_{it-1}+\beta_2 lnopen_{it}+\beta_3 lnhexp_{it}+\beta_4 lneexp_{it}+\beta_5(lnhexp_{it}*lneexp_{it})+\lambda Z_{it}+\varepsilon_{it}$……...model 2

Now, another indicator of quality of life (infant mortality rate) is included as a dependent variable to develop model 3 as follows:

$lnimr_{it}=\beta_0+\beta_1 lnimr_{it-1}+\beta_2 lnopen_{it}+\beta_3 lnhexp_{it}+\beta_4 lneexp_{it}+\lambda Z_{it}+\varepsilon_{it}$……...model 3

Here,

lnimr = log of infant mortality rate

The interaction term of public health expenditures and public education expenditures has been included to measure the combined effect of health and education expenditures on infant mortality rate.

$lnimrp_{it} = \beta_0+\beta_1 lnimr_{it-1} + \beta_2 lnopen_{it} + \beta_3 lnhexp_{it}+\beta_4 lneexp_{it}\ \beta_5(lnhexp_{it}*lneexp_{it}) +\lambda Z_{it} + \varepsilon_{it}$……....model 4

3.1 Source of Data

Data is taken from the World Development Indicators (WDI). Panel data of 47 OIC member countries is taken from 1991 to 2017 for complete sample and 2000 to 2017 for decomposition into two categories.

3.2 Methodology

Since two major GMM techniques namely differenced GMM and system GMM are available in the literature, the present study employed GMM method of estimation. Sometimes, the differenced GMM which accounts for the country specific effects have some potential drawbacks. A major problem is that in asymptotic samples the lagged instruments tend to become weak, and, hence, cause biasness in the parameter estimation mostly in small sample size or where corresponding variance is not too large (Alonso and Arrelano, 1999; Blundell and Bond, 1998). The solution of the inconclusiveness and biasness caused by the differenced GMM is the system GMM proposed by Blundell and Bond (1998), Holtz-Eakin et al. (1988), Arellano and Bover (1995), and. This method solves various problems related to panel data for example endogeneity issue, unobserved country-specific effects and inclusion of lagged dependent variables as regressor.

One-step system GMM uses the method of weighted matrices which are independent of estimated parameters. On the other side two-step system GMM uses optimal weighted matrices which weight the moment conditions by a covariance matrix. The use of two-step GMM in small samples may cause problems due to standard error which tends to be small and proliferation of instruments. Therefore, in this paper, one-step GMM is used when having relatively small sample and two-step system GMM is used when sample period is large.

4. Findings and Discussion

Table 1 presents the empirical results based on the first and second-step system GMM and presents the effects of trade openness and public expenditures on health status in OIC countries. The panel data based on sample period from 1991 to 2017 for 47 OIC member countries is undertaken for panel econometric analysis.

Table 1: Dynamic Panel GMM Results (1991 to 2017)

Dependent Variable: life expectancy				
	One-Step System GMM		Two-Step System GMM	
Variables	**Model 1**	**Model 2**	**Model 1**	**Model 2**
lag of life expectancy	.977* {.0008} (0.000)	.980* {.000} (0.001)	.977* {.002} (0.000)	.980* {.001} (0.000)
ln(trade openness)	.037** {.018} (0.04)	.062* {.018} (0.000)	.050* {.013} (0.000)	.039** {.019} (0.047)
ln(gross domestic product)	.075* {.007} (0.000)	.066* {.008} (0.000)	.079* {.022} (0.000)	.095* {.021} (0.000)
ln(public health expenditures)	.040* {.015} (0.010)	.0766* {.021} (0.001)	.0059 {.024} (0.80)	.062*** {.038} (0.090)
ln (public education expenditures)	.136* {.026} (0.000)	.153* {.049} (0.002)	.134* {.024} (0.000)	.088*** {.045} (0.060)
ln (food availability)	.064** {.033} (0.050)	.017 {.035} (0.624)	.049** {0.02} (0.021)	.013 {.022} (0.357)
ln(public health expenditures*public education expenditures)	----------	.109* {.025} (0.000)	----------	.076* {.025} (0.000)
constant	.772* {.087} (0.000)	1.256* {.104} (0.001)	.857* {.191} (0.000)	.850* {.215} (0.000)
AR{1} test, p-level	0.12	0.09	0.09	0.13
AR{2} test, p-level	0.20	0.11	0.35	0.31
Hansen Test p-level	0.99	0.93	0.22	0.14
number of years	27	27	27	27
number of countries	47	47	47	47

Note: The figures in { } and ( ) are standard errors and probability respectively. *, ** and *** indicates statistical significance at 1%, 5% and 10% respectively.

The results of one-step and two-step system GMM in model1 and 2 show that trade openness, public health expenditures, public education expenditures and GDP are

positively and significantly correlated with life expectancy and this is similar with earlier findings of Bergh and Nilsson (2010), Ali and Audi (2016) and Alam et al. (2015). Food availability has positive but insignificant relationship with life expectancy in one-step system GMM (model1) and two-step system GMM (model 1 and two). The results show that trade openness and public expenditures are contributing to improve the health status in OIC countries. The values of diagnostic tests support the validity of our models. Hansen test of over-identifying restrictions compute the overall validity of the instruments.

Since the overall OIC countries are considered in table 1 for the period 1991 to 2017, now we classify OIC countries into two groups namely low income and high income OIC member countries. In low income OIC countries, all those countries are included which have been defined as low income and lower middle-income countries by new countries classification of World Bank, 2019. In high income OIC countries, upper-middle income and high-income countries are considered with the data from 2000 to 2017.

Table 2: Dynamic Panel GMM Results (2000-2017)

Dependent Variable: Life Expectancy						
	Overall OIC countries		**Low -Income OIC Countries**		**High -Income OIC Countries**	
Variables	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
lag of life expectancy	.974* {.000} (0.000)	.975* {.000} (0.000)	.981* {.0006} (0.000)	.978* {.000} (0.000)	.984* {.002} (0.000)	.981* {.002} (0.000)
ln(trade openness)	.048** {.025} (0.054)	.051** {.023} (0.029)	.0316** {.013} (0.020)	.104* {.017} (0.000)	.063** {.027} (0.022)	.129* {.033} (0.000)
ln(gross domestic product)	.055* {.008} (0.000)	.070* {.008} (0.000)	-.012** {.006} (0.057)	-.013*** {.007} (0.080)	.047* {.012} (0.000)	.052* {.013} (0.000)
ln(public health expenditures)	.076* {.0152} (0.000)	.181* {.038} (0.001)	.081* {.016} (0.000)	.148* {.028} (0.000)	.097* {.033} (0.004)	.096* {.033} (0.004)
ln (public education expenditures)	.112* {.028} (0.000)	.518* {.122} (0.000)	.297* {.021} (0.000)	.427* {.040} (0.000)	.380* {.047} (0.000)	.199* {.072} (0.006)
ln (food availability)	.008 {.037} (0.824)	.020 {.037} (0.580)	.079* {.031} (0.013)	.112* {.038} (0.004)	.195** {.083} (0.021)	.222* {.084} (0.009)

ln(public health expenditures*public education expenditures)	----------	.190* {.064} (0.004)	----------	.085* {.023} (0.000)	_____	.081* {.021} (0.000)
constant	1.262* {.090} (0.000)	.717* {.103} (0.001)	1.222* {.071} (0.000)	1.302* {.083} (0.000)	1.755 {.228} (0.000)	1.706* {.246} (0.000)
AR{1} test, p-level	0.11	0.09	0.09	0.13	0.10	0.11
AR{2} test, p-level	0.20	0.12	0.32	0.33	0.34	0.35
Hansen Test p-level	0.99	0.91	0.21	0.12	0.12	0.12
number of years	18	18	18	18	18	18
number of countries	47	47	47	47	47	47

Note: The figures in { } and ( ) are standard errors and probability respectively. *, ** and *** indicates statistical significance at 1%, 5% and 10% respectively.

In table 2, the results of one-step and two-step system GMM in model1 and 2 show that trade openness, public health expenditures, public education expenditures and Growth are positively and significantly correlated with life expectancy in overall OIC countries and high income OIC countries and this is similar with earlier findings of Alam et al. (2015), Audi (2016), Owen and Wu (2007) and Bergh and Nilsson (2010). GDP is negatively and significantly correlated with life expectancy in low income OIC countries. This is consistent with the results of Cornia et al. (2007) and Jorgenson and Burns (2004). The possible reason for the negative relationship of GDP with life expectancy in low income OIC countries is that these countries do not properly utilize their income to provide basic necessities of life. Food availability has positive but insignificant relationship with life expectancy in model 1 and two) in overall OIC countries.

Table 3: Dynamic Panel GMM Results (1991 to 2017)

Dependent Variable: log of infant mortality rate (IMR)				
	One-Step System GMM		**Two-Step System GMM**	
Variables	**Model 3**	**Model 4**	**Model 3**	**Model 4**
lag of ln(infant mortality rate)	.990* {.001} (0.000)	.991* {.001} (0.000)	.989* {.003} (0.000)	.987* {.004} (0.000)
ln(trade openness)	-.003* {.000} (0.000)	-.001** {.0009} (0.050)	-.002*** {.001} (0.088)	-.002*** {.001} (0.065)
ln(gross domestic product)	-.003* {.0003} (0.000)	-.003* {.000} (0.000)	-.004* {.000} (0.000)	-.006* {.0021} (0.004)
ln(public health expenditures)	-.005* {.000} (0.000)	-.016* {.0015} (0.000)	-.003* {.0019} (0.087)	.-.013* {.003} (0.000)
ln (public education expenditures)	-.005* {.001} (0.000)	-.046* {.004} (0.000)	-.005* {.0018} (0.006)	-.039 {.037} (0.581)
ln (food availability)	-.019* {.001} (0.000)	-.022* {.001} (0.000)	-.015* {.0034} (0.000)	-.014* {.002} (0.000)
ln(public health expenditures*public education expenditures)	----------	-.023* {.002} (0.000)	----------	-.020* {.003} (0.000)
constant	.011** {.004} (0.020)	.022* {.005} (0.000)	.024* {.013} (0.092)	.069** {.027} (0.016)
AR{1} test, p-level	0.12	0.10	0.098	0.280
AR{2} test, p-level	0.20	0.113	0.20	0.12
Hansen Test p-level	0.90	0.99	0.209	0.115
number of years	27	27	27	27
number of countries	47	47	47	47

Note: The figures in { } and ( ) are standard errors and probability respectively. *, ** and *** indicates statistical significance at 1%, 5% and 10% respectively.

In table 3, dependent variable is log of infant mortality rate. The results of one-step and two-step system GMM in model 3 and 4 show that trade openness, public health expenditures, public education expenditures, GDP and food availability are negatively and significantly correlated with infant mortality rate in overall OIC countries during 1991 to 2017. The results show that trade openness and public expenditures are contributing to improve the health status in OIC countries.

Table 4: Dynamic Panel GMM Results (2000-2017)

Dependent Variable: log of infant mortality rate (IMR)						
	Overall OIC countries		**Low Income OIC Countries**		**High Income OIC Countries**	
Variables	**Model 3**	**Model 4**	**Model 3**	**Model 4**	**Model 3**	**Model 4**
lag of ln(infant mortality rate)	0.988* {.001} (0.000)	0.989* {.001} (0.000)	0.002** {.001} (0.066)	1.00* {.001} (0.000)	.998* {.001} (0.000)	.994* {.001} (0.000)
ln(trade openness)	-.005* {.000} (0.000)	-.002*** {.001} (0.090)	.003* {.001} (0.000)	.002*** {.001} (0.067)	-.019* (.002) (0.000)	-.010* {.001} (0.000)
ln(gross domestic product)	-.004* {.000} 0.000	-.003* {.0003} (0.000)	-.0008** {.0003} (0.017)	. -.001* {.0003} (0.002)	-.0023** {.001} (0.033)	-.002* {.000} (0.000)
ln(public health expenditures)	-.006* {.0008} (0.000)	-.015* {.001} (0.000)	-.002* {.0009} (0.011)	-.007* {.0024} (0.004)	-.007* {.001} (0.000)	-.011* {.002} (0.000)
ln (public education expenditures)	-.003** {.001} (0.022)	-.032* {.0041} (0.000)	-.004* {.001} (0.001)	-.022* {.006} (0.000)	-.035* {.002} (0.000)	-.041* {.007} (0.000)
ln (food availability)	-.017* {.001} (0.000)	-.012* {.002} (0.000)	-.003 {.002} (0.320)	-.002 {.002} (0.304)	-.034* {.003} (0.000)	-.029* {.003} (0.000)
ln(public health expenditures*public education expenditures)	----------	-.019* .002 0.000	----------	-.017* {.004} (0.000)	———	-.006** {.003} (0.050)

constant	.021* {.005} (0.000)	.037* {.005} (0.000)	.014* {.005} (0.005)	.017* {.005} (0.001)	-.066* {.009} (0.000)	-.003 {.007} (0.603)
AR{1} test, p-level	0.13	0.09	0.090	0.112	0.117	0.204
AR{2} test, p-level	0.14	0.15	0.21	0.351	0.123	0.25
Hansen Test p-level	0.99	0.91	0.209	0.115	0.125	0.14
number of years	18	18	18	18	18	18
number of countries	47	47	47	47	47	47

Note: The figures in { } and ( ) are standard errors and probability respectively. *, ** and *** indicates statistical significance at 1%, 5% and 10% respectively.

In table 4, the data analysis for overall OIC countries, low income OIC countries and high income OIC countries are presented for the period 2000 to 2017. The results of one-step and two-step system GMM in model 3 and 4 shows that trade openness, public health expenditures, public education expenditures and GDP are negatively and significantly correlated with infant mortality rate in overall OIC countries and high income OIC countries. These results are consistent with the study of McNamara (2017), Alam et al. 2016) and Herzer (2017). GDP has positively and significantly correlated with infant mortality rate in low income OIC countries. This situation is contrary to the theory. The positive impact of trade openness on infant mortality rate in low income OIC countries might be due the illegal or demerit goods trade problem indicated in Huynen et al. (2005) which states that increased trade causes adverse effects on health due to increased trade of health damaging products for example tobacco, alcohol and unhealthy foods.

5. Conclusion and Policy Implications

The study shows that trade openness, public health expenditures, public education expenditures and GDP are positively and significantly correlated with life expectancy in overall OIC countries and high income OIC countries. GDP is negatively and significantly correlated with life expectancy in low income OIC countries. Trade openness, public health expenditures, public education expenditures and GDP are negatively and significantly correlated with infant mortality rate in overall OIC countries and high income OIC countries. GDP has positively and significantly correlated with infant mortality rate in low income OIC countries. This situation is contrary to the theory. The positive impact of trade openness on infant mortality rate in low income OIC countries might be due the illegal or demerit goods trade problem. The study shows that trade openness and public expenditures are contributing to improve the health status in OIC countries. The Muslim countries should invest in health and education for more growth and development. The OIC member countries should also eliminate trade barriers

to each other for more trade opportunities for sustainable growth of the economies. The governments of OIC member countries should minimize their non development expenditures and reduce their budget deficit so that significant amount of finances should be made expenditures on health and education. In future research, the impact of health status on poverty can be examined in panel data of many developing countries.

REFERENCES

Alam, M. S., Raza, S. A., Shahbaz, M., & Abbas, Q. (2016). Accounting for Contribution of Trade Openness and Foreign Direct Investment in Life Expectancy: The Long-Run and Short-Run Analysis in Pakistan. *Social Indicators Research, 129*(3), 1155–1170.

Abbott, P. A., & Coenen, A. (2008). Globalization and advances in information and communication technologies: The impact on nursing and health. *Nursing Outlook, 56*(5), 238-246.

Alam, M. S., Raza, S. A., Shahbaz, M., & Abbas, Q. (2016). Accounting for contribution of trade openness and foreign direct investment in life expectancy: The long-run and short-run analysis in Pakistan. *Social Indicators Research, 129*(3), 1155-1170.

Ali, A., & Audi, M. (2016). The impact of income inequality, environmental degradation and globalization on life expectancy in Pakistan: An empirical analysis. *International Journal of Economics and Empirical Research, 4*(4), 182- 193.

Alonso, B.C. & Arrelano, M. (1999). Symmetrically normalized instrumental-variable estimation using panel data. *Journal of Business and Economic Statistics, 17*(1), 36-49.

Arellano, M., & Bover, O. (1995). Another look at the instrumental-variable of error components models. *Journal of Econometrics,* 68(1), 29-51.

Benarroch, M. & Panday, M. "Trade Openness and Government Size." Economic Letters, 2008: 157-159.

Bloom, D. E., Canning, D., & Sevilla, J. (2004). The effect of health on economic growth: A production function approach. *World Development, 32*(1), 1–13.

Blouin, C., Chopra, M., & van der Hoeven, R. (2009). Trade and social determinants of health. *The Lancet, 373*, 502–507.

Bergh, A., & Nilsson, T. (2010). Good for living? On the relationship between globalization and life expectancy. *World Development, 38*(9), 1191-1203.

Benoit, K. (2011). Linear regression models with logarithmic transformations. *London School of Economics, 22*(1), 23-36.

Blundell, R. & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*(1), 115-143.

Cornia, G. A., Rosignoli, S., & Tiberti, L. (2007*). Globalization & health: impact pathways and recent evidence*, WIDER Working Paper No. 2008.74.

De Mendonça, H. F., & Cacicedo, T. (2015). Size of government and economic growth in the largest Latin American country. *Applied Economics Letters*, *22*(11), 904-910.

De Mendonça, H. F., & De Oliveira, A. J. (2019). Openness and government size: A new empirical assessment". *Economics Bulletin*, *39*(2), 982-995.

Dollar, D., & Kraay, A. (2002). Growth is good for the poor. *Journal of Economic Growth*, *7*(3), 195–225.

Dollar, D., & Kraay, A. (2004). Trade, growth, and poverty. *The Economic Journal*, *114*(493), F22-F49.

Dreher, A., & Gaston, N. (2008). Has globalization increased inequality? *Review of International Economics*, *16*(3), 516–536.

Edeme, R. K., Emecheta, C., & Omeje, M. O. (2017). Public health expenditure and health outcomes in Nigeria. *American Journal of Biomedical and Life Sciences*, *5*(5), 96-102.

FAO. (2019). *Investing in agriculture for a better future*. UN Library. https://doi.org/10.18356/3e6e633a-en

Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political Economy*, *80*(2), 223-255.

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica: Journal of the Econometric Society*, *50*(4), 1029-1054.

Hartwing J (2009). Is health capital formation good for long-term economic growth? – Panel Granger-causality evidence for OECD countries. Journal of Macro Economics, 32(1), 314-325.

Herzer, D. (2017). The Long-run relationship between trade and population health: Evidence from five decades. *The World Economy*, *40*(2), 462-487.

Holtz-Eakin, D., Newey, & W., Rosen, H. (1988). Estimating vector autoregressions with panel data. *Econometrica*, 56(6), 1371-1395.

Huynen, M. M., Martens, P., & Hilderink, H. B. (2005). The health impacts of globalization: a conceptual framework. *Globalization & Health*, *1*(1), 1-14.

Hamid, Z., & Amin, R. M. (2013). Trade and Human Development in OIC Countries : A Panel Data Analysis. *Islamic Economic Studies*, *21*(2), 55–70.

Jorgenson, A. K., & Burns, T. J. (2004). Globalization, the envi - ronment, and infant mortality: a cross national study. *Humboldt Journal of Social Relations*, *28*(1), 7-52.

Karim, D. O. (2016). Health Expenditure and Economic Growth Nexus: An ARDL-Type Analysis for Nigeria. Imperial Journal of Interdisciplinary Research, 2 (2), 516-529.

Kefeli, A. A. O. A. W. and Z., & Hashim, and N. (2018). Investigating The Dynamic Effect of Healthcare Expenditure and Education Expenditure On Economic Growth in Organisation of Islamic Countries (OIC). *International Journal of Economic Sciences*, *v 10*(7326), 27.

Kim, T.K., & Lane, S.R. 2013. Government health expenditure and public health outcomes: A comparative study among 17 countries and implications for US Health Care Reform. American International Journal of Contemporary Research 3(9): 8-13.

Labonté, R., Mohindra, K., & Schrecker, T. (2011). The growing impact of globalization for health and public health practice. *Annual Review of Public Health*, *32*(1), 263-283.

Levine, D. I., & Rothman, D. (2006). Does trade affect child health?. *Journal of health Economics*, *25*(3), 538-554.

Lynch, J. W., Kaplan, G. A., Pamuk, E. R., Cohen, R. D., Heck, K. E., Balfour, J. L., & Yen, I. H. (1998). Income inequality and mortality in metropolitan areas of the United States. *American Journal of Public Health*, *88*(7), 1074-1080.

Mehrara, M., & Musai, M. (2011). Granger causality between Health and Economic Growth in oil exporting countries. *Interdisciplinary Journal of Research in Bussiness*, *1*(August), 103–108.

Kawachi, I., & Wamala, S. (Eds.). (2006). *Globalization and health.* Oxford University Press.

Ministry of Iraqi Health. (2017). *National Health Report*, Government of Iraq.

Mustafa, G., Rizov, M., & Kernohan, D. (2017). Growth, human development, and trade: The Asian experience. *Economic Modelling*, *61*(December 2016), 93–101.

McNamara, C. (2017). Trade liberalization and social determinants of health: a state of the literature review. *Social Science & Medicine*, *176*, 1-13.

Novignon, J., & Atakorah, Y. B. (2016). *How does the health sector benefit from trade openness? Evidence from panel data across sub-Saharan Africa countries* (MPRA Working Paper No. 72258)

Novignon, J., Olakojo, S. A., & Nonvignon, J. (2012). The effects of public and private health care expenditure on health status in sub-Saharan Africa: New evidence from panel data analysis. *Health Economics Review*, *2*(1), 1–8.

Odior, E. S. O. (2011). Government expenditure on health, economic growth and long waves in a CGE micro-simulation analysis: The case of Nigeria. *European Journal of Economics, Finance and Administrative Sciences*, *31*(31), 99–113.

Owen, A. L., & Wu, S. (2007). Is trade good for your health? *Review of International Economics*, *15*(4), 660–682.

Pham, N.T.A. (2016). *Trade and Economic Development : Evidence from Less Developed Countries.* PhD dissertation, University of Adelaide.

Pamuk, E. R., Fuchs, R., & Lutz, W. (2011). Comparing relative effects of education and economic resources on infant mortality in developing countries. *Population and Development Review*, *37*(4), 637-664.

Popkin, B. M. (2006). Technology, transport, globalization and the nutrition transition food policy. *Food Policy*, *31*(6), 554- 569.

Qadir, N., & Majeed, M. T. (2018). The impact of trade liberalization on health: Evidence from Pakistan. *Empirical Economic Review*, *1*(1), 71-108.

Ravallion, M. (2004). Competing Concepts of Inequality in the Globalization Debate. *Brookings Trade Forum*, *2004*(1), 1–38.

Swaroop, V., & Rajkumar, S. A. (2002). *Public spending and outcomes: does governance matter?* The World Bank. Available at: https://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-2840

UNDP (2006) Human Development Report 2006: Beyond scarcity: Power, poverty and the global water crisis, New York.

Woodward, D., Drager, N., Beaglehole, R., & Lipson, D. (2001). Globalization and health: A framework for analysis and action. Bulletin of the World Health Organization, *79*(9), 875–881

Woodward, D., Drager, N., Beaglehole, R., & Lipson, D. (1999). Globalization , global public goods , and health. *Health (San Francisco)*, *1999*, 3–12.