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The Impact of Public Health Policy on Labor Force Participation in Paksitan: A Bound Test Approuch

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Abstract

The main objectives of the current study to examine and forecast the short and long run nexus of public health policy on the labor force participation. Current study select eight indicators for the in depth measurement of public health policy in Pakistan. Moreover, the study relies on time series data which was collected from the World development indicator (WDI) and Pakistan bureau of statistics for the period of forty five years (1972-2016). This helped in providing comprehensive description of the labor force participation. The study used auto regressive distributed lagged (ARDL) and Bound test for the short and long run relationship. In addition, the study also used cumulative sum of residuals (CUSUM) and cumulative sum of squared of residuals (CUSUMSQ) for the stability of finding. Result of the study presents that most of the explanatory indicators have significant short and long run relationship with the labor force participation of the country. Specifically, age dependency, health expenditure, secondary school enrollment, trade openness and gross capital formation are the most prevalent factors influencing the labor force supply of the country. Moreover, finding of the current study is confirmed through stability tests like CUSUM and CUSUMSQ. The study provides in depth information for the policy maker to design policy in favor of peoples in order to maximize the labor force and increase the economic development of the country.

Keywords: Labor force participation, Public health policy, WDI, ARDL, CUSUM, CUSUMSQ, Bound test

1. Introduction

Economic growth (GDP, per capita income etc) and economic development (life expectancy, poverty rate, infant mortality rate and literacy rate) of the nation is entirely depending on the quality and quantity of the labor force of that nation. In case of Pakistan, a remarkable

segment of population is considered as out of labor force. This study focused on the participation rate of labor force for which numerous arguments are applied for the labor supply in general. The most prominent approach for the association of health and labor market behavior considered health of individual as a human capital. According to (Becker, 1964) argue and drew an analogy for the relationship between investment incurred for the health and in other form of human capital like education. Later on, this approach was established by (Grossman, 1972). To realize in depth the potential gain in productivity, individuals have an incentive to invest in the human capital like makes investment in providing formal education or giving training to individuals during job. Such kinds of investments have benefits while the opportunity costs of such practice are considered to be direct withdrawal outlays on market goods and the opportunity cost of the time must be outlays from competing uses. The same framework was brought under consideration by (Becker, 1967) and (Ben-Porath, 1967) in order to established a model which facilitate and present an optimal level of investments in human capital at any stage.

Conventional wisdom confirms that for the development of human skill and knowledge, human's ability is considered and for the human ability, health plays a role of key factor. Usually human ability or human capital which is the aggregation of skill, knowledge and capabilities is cheerfully linked to his production and also requirement for his labor. At a conceptual level, increase which occurred in an individual bulk of knowledge or human capital is considered to enhance fertility of an individual in the market arena of the economy as well as in the non market sector. In the market sector an individual generate earning while in the non market sector he produce commodity that enter his utility function. Keeping in views the performance of an individual, health is the most valuable and important factor because it affects the entire function of an individual. The cost incurred for the treatment of week health and the worth of output which lost can be measures of the economic cost of poor health (Holt, 2010). Summarizing, health is considered to be the decisive capital which the individuals or human being have. If such vital capital of an individual corrodes or not fully and properly developed, than it can influence the physical and mental condition of an individual negatively which will result to create obstacles in the people's lives. The association between income of individuals and health can viewed in last connection that how health of an individual can influence the future income, wealth and consumption of human being (Lillard & Weiss, 1997; Smith, 1999).

This study used the human capital theory as the underpinning theory, because this theory is closely associated with the human resource. In same way, this study also focused on the labor force participation which is mostly depends on the individuals attributes comprise of various things. These may include health condition, individual's education and economic condition of the country. The deep association among individual attributes, human capital and labor force participation compel this study to used human capital theory and contribute to this theory. This theory is basically traced from the original work of Adam Smith in 18th century. However, after proper amendment this was popularized by Gray Backer and wins the Nobel Prize through it. Human capital is supposed to be the most important factor for innovation of economic development of any country. Usually, current regional disparities in innovation and economic development is mostly depend on the past human capital and regional disparities

(Diebolt & Hippe, 2019).

1.1 Labor Force Participation in Pakistan

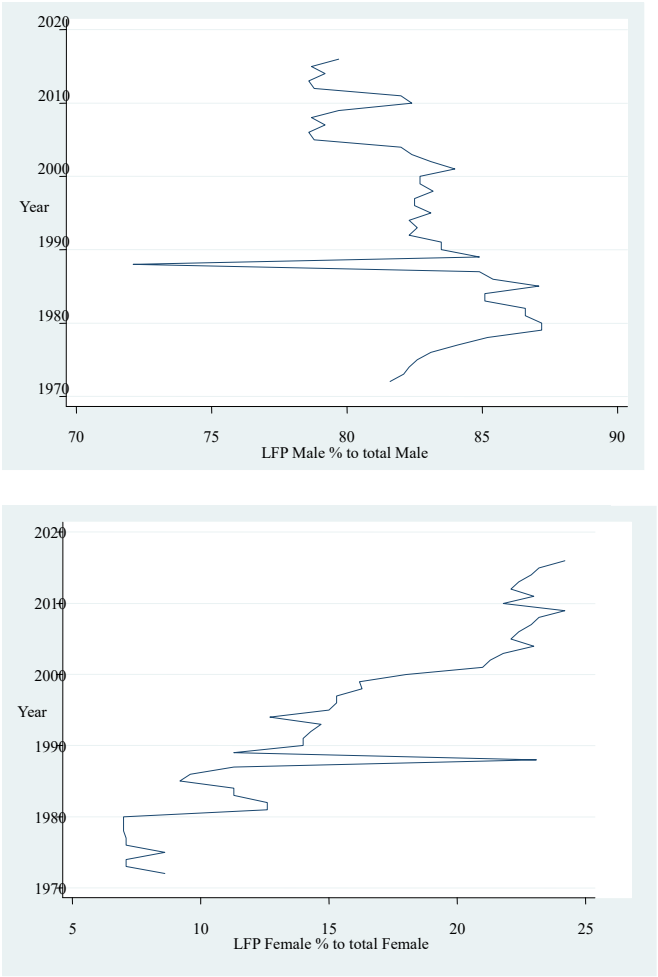


Figure 1. Graphical representation of labor force participation in Pakistan

Pakistan is one among top ten countries whose majority of population exists in the working age. This means that most of the population in Pakistan can take active part in the labor force market to play significant role in the economic development of the country. This population comprises of both male and female and put a well opportunity for the government to utilize it and smooth way for the economic growth. Above figure one, exhibit the participation rate of both male and female labor force from its entire population. The male labor force participation shown in the figure is very high as compared to female labor force in Pakistan. Reason behind this is male has more opportunity in the labor market in Pakistan. Moreover, male has also highest quota in each and every labor market as compared to female in Pakistan. The participation rate of women labor force in Pakistan is so far very less in comparison to rest of other countries of the same income level despite growing at very high ratio in the last 2 decades. Moreover, women along with high education are still out of the labor market in Pakistan. It has been shown that only 25% of female with university degree are doing work

out of their home.

The main aim of the study is to examine the impact of public health policy on the labor force participation in Pakistan. Usually two important areas are under focused which are much important and play key role in the economic development of the country. These areas are the health related indicators and labor force participation. Labor force participation includes both male and female is most prevalent factor for the economic prosperity of the country. Pakistan is a country where most of the population comprises of both male and female are the young peoples. More than 55% of the entire population is in the working age which means that such portion of population can easily take part in the labor market (Wiki, 2019). On the other side, the health condition of Pakistan is alarming. Health issues are considered to be the major of all across the world and more specifically in the poor developed countries like Pakistan. The most relevant indicators of health in Pakistan especially pertaining to female and children are not very well encouraging. It is fact that if you considered and compared actually the health related indicators in the previous one decade. You will find it amazing by realizing that the maternal mortality or the infant mortality rate in the country has hardly variate ten figures here and there. It is evident that from thousand children born in one year, approximately 95-100 died before they reached their first birthday which is alarming. After each and every 20 minutes, one female dies due to pregnancy-related issues and complications (Maqsood 2017).

2. Methodology

2.1 The Variables

In order to achieve the main objectives of the study by examining the impact of public health policy on the labor force participation in Pakistan. This study used a number of variables including dependent, independent and control variables.

2.1.1 Dependent Variable

2.1.1.1 Labor Force Participation Rate

To achieve this objective, this study treats the labor force participation as dependent variable. Participation rate of the labor force is the section of working population lying at the age group between 16-64 in the economy which are presently employed or searching for employment. Normally, the labor force of any country includes each individual at working age which is typically above (around 14-16) and below the retirement age (around 65) who are participating workers, that is individual involved employed or searching for employment. Those peoples which did not come in the labor force participation rate include students, retired people, stay at home parents, and stay in prison or similar institution. Moreover, individual who is employed in job or profession but has unreported income and discourage worker who cannot find work are also excluded from it. The labor force participation rate is measure as the ratio of labor force divided by the total working age population. This study used as a percentage for the labor force participation following the previous study of (Mushtaq, Mohsin, & Zaman, 2013).

2.1.2 Independent variables (Health Inputs)

2.1.2.1 Health Expenditure

Health expenditure is treated and independent variable to examine the short and long run

relation between health indicators and labor force participation in Pakistan. Total health expenditure in the addition of all public and private health expenditure and it can be measure as the percentage of GDP following the study of (Mushtaq, Mohsin, and Zaman 2013; Rauf et al. 2018). Health expenditure covers the health services provision including both preventive and curative. Moreover, it also includes various sort of activities for the family planning, activities taken for the nutrition and emergency aid which designated for the health related issues excluding provision of water and sanitation. Previous finding present that health expenditure is the key factor influencing the labor force participation positively. Increase in health expenditure result in standard life of individuals as well as enhance the labor force participation in the country.

2.1.2.2 Population per Bed Doctor

Population per bed doctor is treated as an independent variable which is considered as health input variable. Hospital beds consist of those beds which are available in the private hospital, public hospital, general and specialized hospital as well as in the rehabilitation centers. Those hospitals are establishment permanently by at least one physician. Following the previous studies of (Mushtaq, Mohsin, & Zaman, 2013; Rauf et al., 2018), this study also measure the population per bed doctor as the number of physician/doctor per 1000 peoples. When health expenditure increased in the country than the availability of doctors to population also occurred according to its standard. This improved the psychological strength of each individual and hence they have time to participate in the labor market. Population per bed doctors has been focused in the current study because of its dominant role over the psyche of individuals. Further, these individuals become part of the labor market and play an important role for the country economic development.

2.1.2.3 Age Dependency

Age dependency is treated as health output and independent variable is the current study. This is a working age-population ratio of those individuals which are not typically included in the labor force (the dependent part of population) and those which are specifically counted and included in the labor force (the productive part). Therefore, this is used to measure the pressure on the productive population. It is measure as percentage of age population ratio of those which are typically not in the labor force market or dependent population like previous studies of (Rauf et al., 2018; Mushtaq, Mohsin, & Zaman, 2013; Zohaib Ali, 2017). Age dependency usually reduces the labor force participation of the country and mostly studies presents that it relates negatively to the labor market. It is the most prevalent factors largely influence the labor force and economic development of the country. Due to its vast influence, the current study focused it to examine its nexus with the labor force participation.

2.1.2.4 Life Expectancy at Birth

One of the health output indicator which is considered as explanatory variable in the current study to examine the influence of indicators which relevant and appropriate to health on the labor force participation in Pakistan. It is the statistical measure which present the average time an individual is expected to live. This (life expectancy) is based on the year of its birth, its current age and other demographic factors including gender. The most common measure of life expectancy is at birth. Following the previous studies (Mushtaq, Mohsin, & Zaman,

2013; Rauf et al., 2018), this study also measure the life expectancy as average total number of years of an individual have from birth to death. Life expectancy has also an influential role in the labor market. Life expectancy results from health condition and economic situation of the country. Increase in both maximizes the expectancy ratio of individuals which lead to enhance the labor force participation in the country. It has been focused as independent variable in the current study due to its role in the human life and hence in the labor market of the country.

2.1.2.5 Infant Mortality Rate (IMR)

It is also one of the vital health output indicators and treated as independent variable in the current study following the previous studies of (Rauf et al., 2018; Mushtaq, Mohsin, & Zaman, 2013; Narayan & Smyth, 2006). Mortality rate is the total number of death take place in a population of the country which is scaled to the size of that population per unit of time. This study measure the mortality rate is the number death take place in a country per 1000 population of that country in a unit time. Infant mortality rate usually influence the female labor force of the country. Lower the infant mortality rate means less chance of child death during the birth. This influence the entire life of female, because if this ratio is high or child death at the birth stage increased than it would be difficult for the women to remain active and take interest in the labor market. Increased infant mortality rate will give less time for female to take part in the labor market as she has to develop and sustain her family as well. This result to influence the entire labor force participation ratio. Due to its vast impact, this study also treated it as independent variable to examine its relation with the labor force in depth.

2.1.2.6 Trade Openness (TO)

Trade openness is one of the major factors that influence the labor force participation in the country. It also presents the entire economic position of the country which reflects the policies of the country for providing health facilities. Therefore, it is considered in the list of other factors which are related to health indicators. Trade openness presents the elimination of all type of restriction or barriers which may create or considered as an obstacle in the way of free trade between the nations. More precisely trade openness is the reduction of both tariff and non-tariff obstacles. Tariff obstacles may include duties and surcharges while the non-tariff barrier comprise of licensing rules, quotas and other requirements. The way through which easiness is created and restrictions are eliminated is mostly referred to promoting free trade. Following the previous studies of (Mushtaq, Mohsin, and Zaman 2013; Rauf et al. 2018), this study also measure trade openness is the addition of total import and export as a percentage of the gross domestic product (GDP). Increase in trade openness provides vast opportunities for the peoples and as result they can take part in it easily.

2.1.2.7 Gross Capital Formation

Gross capital formation is also treated as other factor which is linked to health related indicators. Gross capital formation is usually named as the gross domestic investment which is the increase of fixed assets of the economy along with the net change in inventories. It also referred to increase in the physical asset which is the subtraction of disposal from investment within a measurement period. This study treat is as independent variable and measure it as the

percentage of gross domestic product (GDP) following the studies of (Mushtaq, Mohsin, & Zaman, 2013; Rauf et al., 2018; Ongo & Vukenkeng, 2014; Akobeng, 2017). The gross capital formation usually reduces the poverty in the country and as a result increases in the labor market. Fixed asset formation maximizes investment in the country which create labor opportunity and as a result labor force participation ratio increased. Due to its influential role in the economic growth and labor market, this study also used it as independent variable to examine its association with the labor force participation.

2.1.2.8 Secondary School Enrollment

Secondary school enrollment is treated as independent variable. This is the proportion of official age suitable for the secondary school education according to the national regulation that is actually enrolled in the secondary school. The association between educational attainment and labor force participation may be justify through various reasons. First, it is confirmed that labor force have important and key influence on the long term economic growth of an economy and education is the major determinants of participation. Second, the relation between education and labor force participation is also important from the social policy point of view. Finally, this relationship is also helpful to know and understand the return to education. Following previous studies (Bowen & Finegan, 1966; Mushtaq, Mohsin, & Zaman, 2013; Rauf et al., 2018), this study also used secondary school enrollment as independent variable to examine the influence of health on the labor force participation in Pakistan.

2.2 The Data

This study used time series data during the period from 1972 to 2016. These 45 years of data was selected to examine in depth the association between participation rate of the labor force and health policy of the country.

The study used two different reliable sources for the collection of data. First, the main source which is used for the collection of data is the World development indicators (WDI). It is the World Bank premier compilation of international statistics on global development which is derived from those sources which are officially recognized. The WDI includes national, regional and global estimate and provide access to approximately 1600 indicators for 217 economies. The WDI usually explore data regarding poverty, health, demographic to GDP, trade and the environment. All this prove that WDI is the most reliable source through which a lot of studies are relying. Therefore, this study also used the WDI is the main source for the data collection related to health indicators and labor force participation. This study also used economic survey of Pakistan and labor force statistics from the Pakistan bureau of statistics for the data collection during the period 1972 to 2016.

2.2.1 Model of the Study

To examine the impact of indicators which is most appropriate for the public health policy on the participation rate of the labor force in Pakistan, the below statistical model is used. Through this model, the study will analyze the current influence of health related indicators on the LFP. Further, the study will also going to forecast this relationship in the short run as well as in the long run in order to exhibit an entire nexus between the said variables.

$$LFP_{it} = \gamma_0 + \beta_1 HE_{it} + \beta_2 PPBD_{it} + \beta_3 AD_{it} + \beta_4 LE_{it} + \beta_5 IMR_{it} + \beta_6 TO_{it} + \beta_7 GCF_{it} + \beta_8 SSE_{it} + \varepsilon \quad ---------- (2)$$

Equation 2, presents the statistical regression model to examine the impact of health related indictors on the labor force participation in Pakistan. In the above equation, LFP stands for labor force participation and treated as dependent variable in the study. On the other hand of the above equation all independent variables are mentioned. These variables are HE (health expenditure), PPBD (population per bed doctors), AD (age dependency), LE (life expectancy), IMR (infant mortality rate), TO (trade openness), GCF (gross capital formation), SSE (secondary school enrollment) while "Ɛ" stands for the error term in the model.

2.2.2 Testing for Unit Root (Measure Stationarity)

Both Dicky Fullar (DF) and augmented Dicky Fullar (ADF) tests are extended for the data estimation. Other tests are also available for testing the stationarity in variable having time series data, however due to a lot of drawback in other test, the current study used the Im, Pesaran and Shin (IPS) (Im, Pesaran, and Shin 2003). Usually the Im Pesaran and Shin test get the average value of Augmented Dickey-Fuller (ADF) statistics.

$$\Delta Y_{i,t} = \alpha_i + \rho_i Y_{i,t-1} + \sum_{k=1}^{n} \emptyset_k \Delta Y_{i,t-k} + \delta_i t + \theta_t + \mu_{it} \quad ----------$$

Usually, the IPS tests the proposed null hypothesis for the proper rejection, the null and alternative hypotheses for the IPS test are formulated as below.

$$H0: \mu i = 0 \ for \ all \ t$$

$$H1: \mu i < 0 \ for \ at \ least \ one \ t$$

Null hypothesis of the IPS test presents that all series of mentioned data has unit root which clearly shows that it is non stationarity process. Similarly, the alternative hypothesis of the IPS test described that some series in the data are stationary which simply means the absence of unit root. The IPS used tough and restrictive assumption for the model formulation.

2.2.3 Johansen Cointegration Test

Performing the unit root test for the stationarity smooth way for the coming step to either check the data for the long run association or eliminate the unit root problem. After confirming the absence of unit root in the data, this study will used the Johansen (Johansen 1991) cointegration test for the long run association of health related indicators and labor force participation. The Johansen test is employed to examine the long run relationship and to find the number of cointegration vectors (Lajdova, Lajda, and Bielik 2016). Usually, the Johansen cointegration test for the existing of long run nexus is based on the two tests which are Trace (J_{Trace}) and Max-Eigenvalue. Both of these tests can be presented through mathematical equations which are given below.

$$J\,trace(M) = -T \sum_{i=m+1}^{k} \ln(1 - \mu i) \quad ----------$$

$$\lambda max(r, r+1) = -T\ln(1-\mu r+1) \quad (3)$$

Where T represents the sample size and μ represent the estimated value for the ith ordered. The Eigen value was from the matrix II, in which "M" is used to indicate the cointegrating vector numbers under the hypothesis. The JTrace test basically test the null hypothesis again the alternative hypothesis which are

$$H0: K = K0$$

$$H0: K > K0$$

While in the other maximum Eigenvalue test, the same central question as the Johansen test is asked.

The difference is however an alternate hypothesis which are.

$$H0: K = K0$$

$$H0: K = K0 + 1$$

2.2.4 The Auto Regressive Distributed Lagged (ARDL) Model

One of the updated way to examine the long run and short run association among the variables is being used the standard Johnson Cointegration and VECM frame- work, however this method face a lot of faults and misleading presented by Pesaran et al. (2001). According to this, the Johnson cointegration test unable to provide you a sustain way which make you able to decide the rank of cointegration. As explanatory variable is I(1) while explained variables are I(0) and I(1) as presented previously. Therefore, the most suitable method and tool is the ARDL (Autoregressive Distributed Lag Model) for the short and long run nexus. Moreover, this kind of dynamic model or tool is a portion of the Koyck distribution class of models. It is executed in those models where the adjustment does not take place urgently; however, it takes a number of time periods for entire adjustment. The current study applies some of the fix restriction to a general ARDL model to examine if partial adjustment is taking place. This sort of model has as its explanatory variable a planned value. This planned value is then examined by the usual independent variables.

For the achievement of results, this study used the ARDL method to establish the presence of long-run and short- run association. ARDL is mostly beneficial as it allows us to presents the presence of an equilibrium association in terms of long-run and short-run dynamics without losing long-run information.

Based on the Pesaran et al. (2001), the current study assembles the vector autoregression (VAR) of order p, denoted VAR (p), presented for the below growth function:

$$Z_t = \mu + \sum_{t=1}^{\rho} \beta lzt - l + \varepsilon t \quad (4)$$

where zt is the vector of both xt and yt , moreover, yt is the explained variable defined as

labor force participation rate (LFPR), xt is the vector matrix which represents a set of independent variables, while t is a time or trend variable used in the study. According to the researcher Pesaran et al. (2001), yt must be I(1) variable, but the regressor xt can be either I(0) or I(1). We further developed a vector error correction model (VECM) as follows:

$$\Delta zt = \mu + at + \lambda zt - 1 + \sum_{t=1}^{p-t} ytDyt - 1 + \sum_{t=1}^{p-1} ytDxt - 1 + \varepsilon t \qquad (5)$$

Where Δ is the first-difference operator. The long-run multiplier matrix λ as:

$$\lambda = \begin{bmatrix} \lambda yy\lambda yx \\ \lambda xy\lambda xx \end{bmatrix}$$

The diagonal elements of the matrix are unrestricted, so the selected series can be either I(0) or I(1). If λYY=0, then Y is I(1). In contrast, if λYY<0, then Y is I(0). In addition, the current study will also utilized Wald test.

3. Results of the Study

3.1 Descriptive Statistics

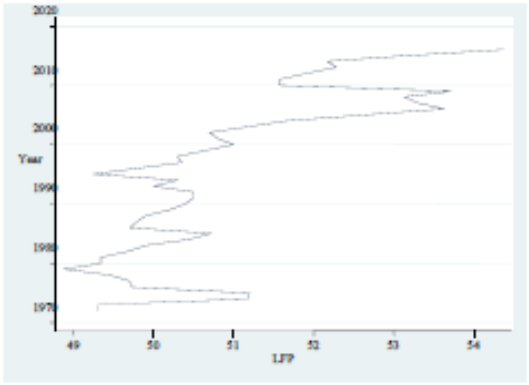
Descriptive statistics is usually the statistical information of all variables used. Current study examined the association of indicators appropriate for health and participation rate of labor force in Pakistan. The following table briefly summarizes all the needed information of health related indicators and labor force participation. This information includes number of observation, mean value of each variable, the lowest and highest value of these variables. Finally the standard deviation of each indicator is mentioned.

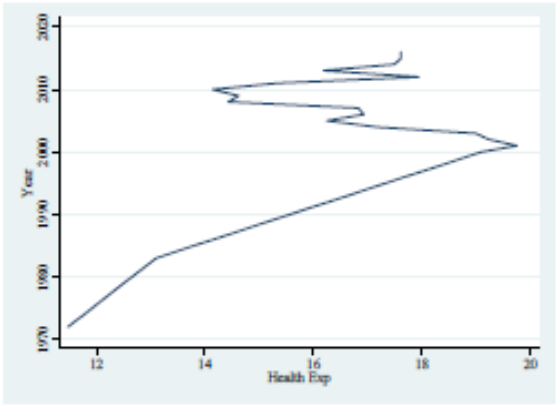
Table 1. Descriptive statistics

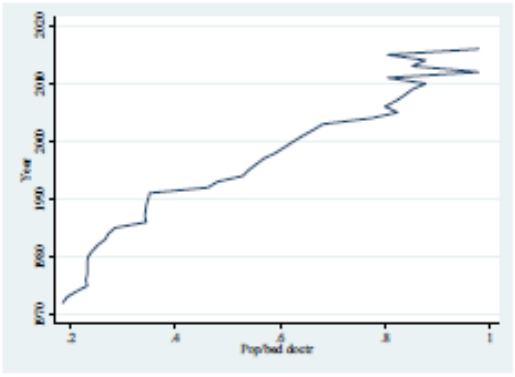
Variables	Observation	Mean	Std dev	Minimum	Maximum
LFP	*45*	3.9286	0.0269	3.8893	3.9958
HE	*45*	2.7241	0.1616	2.4402	2.9833
PPD	*45*	0.5199	0.257	0.185	0.978
AD	*45*	4.441	0.0493	4.3212	4.4871
LE	*45*	4.0336	0.0934	3.8125	4.153
IMR	*45*	4.7917	0.2294	4.3981	5.2459
TO	*45*	3.4699	0.1487	2.9923	3.6612
SSE	*45*	3.6866	0.2544	3.3777	4.0643
GCF	*45*	2.8621	0.1277	2.4472	3.0665

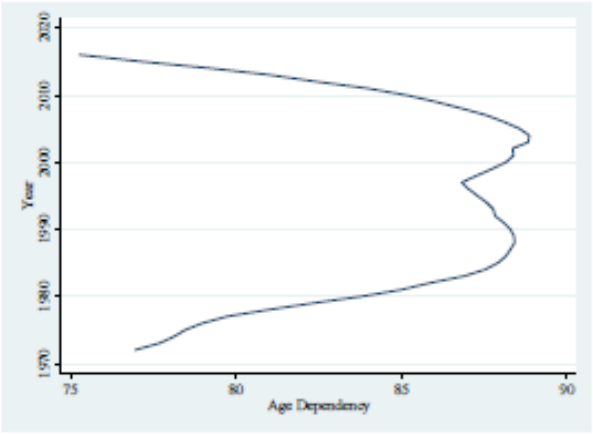
Source: Author.

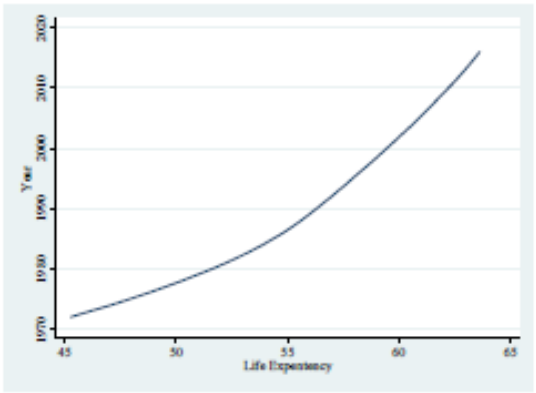
Table 1, briefly presents the statistical information of each variable used in the study to examine the influence of public health policy on the participation rate of labor force in Pakistan.

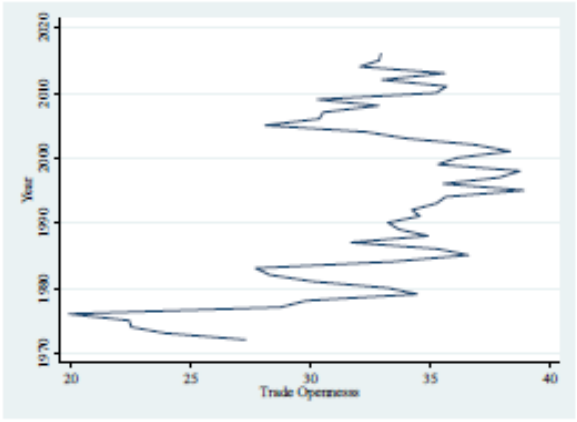

Year
LFP


Year
Health Exp


Year
Pop/bed doctr


Year
Age Dependency


Year
Life Expectancy


Year
Trade Openness

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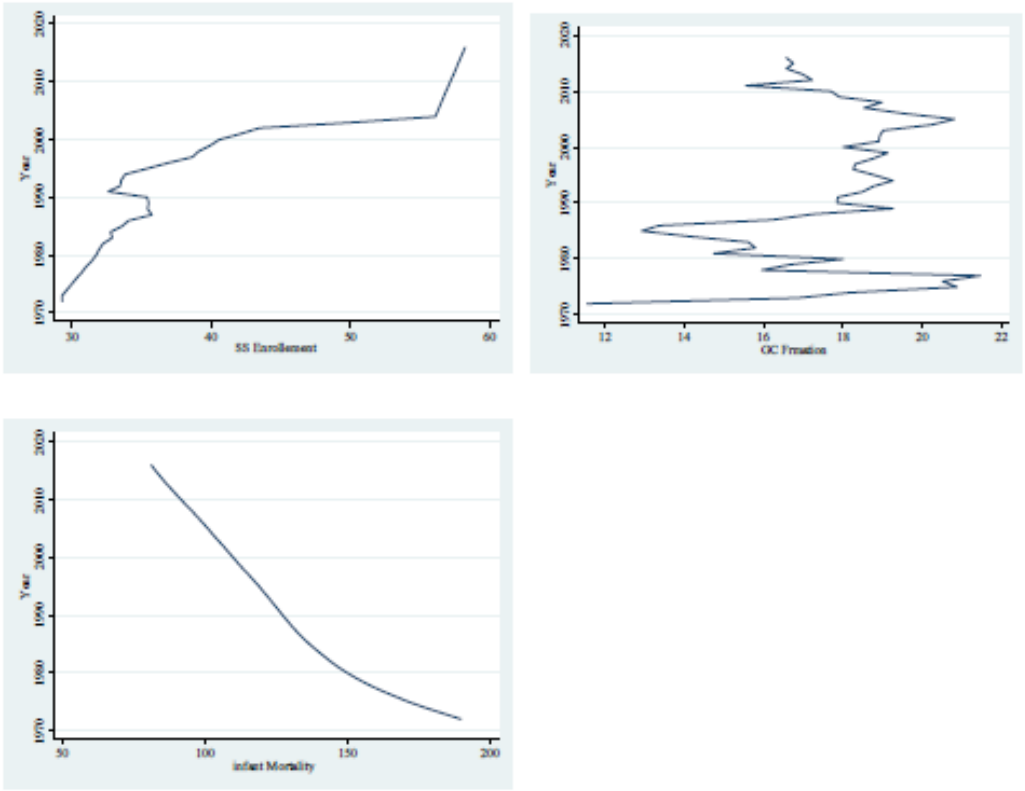

Figure 2. Periodical representation of each variable used

Figure 2, briefly presents the graphical representation of each variable comprises of dependent and independent variables. The vertical side of each graph presents the time period from 1972 to 2016 which is selected period for the current study, while the horizontal side of the graph presents each variable. Correlation Matrix

Multicollinearity is one of the basic assumptions for the classical linear regression model that data used in the analysis will be free from the presence of perfect correlation. Violation of this assumption simply means in the presence of perfect correlation, result of the analysis cannot be relying and will remain biased. Such sort of result which possess the issue of multicollinearity my spurious and no one can rely on that. Usually correlation is mandatory among the variables used in the study but this correlation may not exceed from 90% which is a sign of severe correlation or present of perfect correlation. The following table briefly presents the correlation among all the variables including explained and explanatory variables used in the study to examine the relationship between health policy's indicators and participation rate of labor force. The public health policies are measured through various indicators.

Table 2. Correlation matrix

	LFP	HE	PPD	AD	LE	IMR	TO	SSE	GCF
LFP	1.0000								
HE	0.4112	1.000							
PPD	0.8203	0.7159	1.000						
AD	-0.0983	0.4552	0.0946	1.000					
LE	0.6873	0.8341	0.8132	0.3804	1.000				
IMR	-0.7690	-0.7676	-0.7591	-0.1985	-0.8295	1.000			
TO	0.0252	0.6857	0.3910	0.5653	0.6346	-0.5342	1.000		
SSE	0.8594	0.5862	0.8608	0.0598	0.8692	-0.8323	0.2940	1.000	
GCF	**0.2265**	**0.3435**	**0.2779**	**0.1644**	**0.2435**	**-0.2078**	**-0.0790**	**0.2026**	**1.000**

Source: Author

Table 2, briefly disclosed the correlation among all the indicators used in the study to examine the association between public health policy and participation rate of labor force in Pakistan. From the table it is clear that none of the association among all is in severe portion. Usually, the correlation value exceeding from 90% result in the presence of multicollinearity.

3.2 Auto Regressive Distributed Lagged (ARDL)

This study used the ARDL method which present the short run and long run relationships of independent variables with dependent variable chosen for this study. The ARDL is based on the condition which states that all the indicators utilized in the current study are integrated at the level I (0) or first difference I (1) or mutually cointegrated. Moreover, this method is not applicable in a condition in which only one among all indicators exhibit integration at I (2). Using the ARDL for the time series data, current study obtained outcome which are presented in the below table.

Table 3. Result of the autoregressive distributed lagged (ARDL)

Co-integrating Form

Variable	Coefficient	Std. Error	F-Statistic	Prob.
LnAD	-0.17105	0.05234	3.26805	0.0171
LnGCF	0.12790	0.03069	8.44334	0.0087
LnHE	0.10950	0.04238	8.51669	0.0087
LnIM	-0.01492	3.45102	-0.00432	0.9966
LnLE	0.42317	43.1340	0.06783	0.7972
LnPPD	0.00426	0.02888	0.14749	0.8842
LnSSE	0.20051	0.07580	10.9792	0.0035
LnTO	0.13436	0.02385	6.68775	0.0177
C	-1.11522	0.22815	-4.88805	0.0001

Long Run Coefficient

Variable	Coefficient	Std. Error	T-Statistic	Prob.

LnAD	-0.18004	0.06647	2.70859	0.0297
LnGCF	0.114704	0.041375	2.772272	0.0118
LnHE	0.098212	0.038712	2.536992	0.0196
LnIM	0.171207	0.464088	0.368911	0.7161
LnLE	0.379449	1.478261	0.256686	0.8000
LnPPD	-0.004260	0.028880	-0.147495	0.8842
LnSSE	0.179798	0.066412	2.707314	0.0136
LnTO	0.120482	0.039374	3.059921	0.0062
C	**2.311342**	**7.159008**	**0.322858**	**0.7502**

Table 4, disclosed the short and long run association between labor force participation and all the independent variables used in the study. Table disclosed that most of the explanatory variables show significant relationship with the explained variable, which means that any variation in the explanatory variables results in change of the labor force participation in the country. Table of short run association disclosed that most of the explanatory variables have significant association with the labor force participation. Among the explanatory variables, age dependency shows negative (-0.17105), and statistically significant (0.0171) relationship with the explained variable of the study. This usually means that one percent decrease in the age dependency result to maximize the labor force participation by approximately more than 17 percent. Moreover, gross capital formation and health expenditure are positively (0.12792), (0.10952) and significantly (0.0087), (0.0087) related to the labor force participation of the country. More comprehensively it is stated that variation in the gross capital formation brings change in the dependent variable which is labor force participation. From the table it is cleared that one percent increase in the gross capital formation which is an increase in the fixed capital result to increase the labor force participation by approximately 13 percent.

Similarly, health expenditure is also the prevalent explanatory factor in association with the participation rate of labor force in the country. Table of the short run association presents that one percent increase in the entire expenditure of health result to maximize the labor force participation of the country by approximately 11 percent. This usually means that increasing health expenditure provides good health to the peoples which encourage them to take part in the labor force. In addition, the same table of short run relationship exhibits that secondary school enrollment (SSE) and trade openness (TO) have positive and statistically significant short run relationship with the dependent variable or labor force participation. Result shows that secondary school enrollment has positive (0.20051) and statistically significant (0.0035) association with labor force supply in Pakistan. This means that increase in the enrollment of secondary education by one percent may result to maximize the labor force participation by more than 20 percent. Increase in the school enrollment enhances the education of the country which maximize the labor force and economic development of the country. In the same way, trade openness has also positive (0.13436) and significant (0.0177) association with the labor force. This positive relationship means that one percent increase in the trade openness result to increase the labor force participation by more that 12 percent. Increase in trade openness enhance and strengthen the economic condition of the country which lead to increase investment and create opportunities for the citizens. Increase in labor opportunities

maximizes the labor force of the country. Similarly, the remaining three variables that are infant mortality rate, life expectancy and population per bad doctor are the insignificant variables in association with the labor force participation of the country.

Similarly, the long run association shown in the above table also disclosed that most of the independent variables have significant relationship with the labor force participation. Among the independent variables, age dependency shows negative (-0.18004), and statistical significant association (0.0297) with the dependent variable of the study. This actually presents that age dependency is the key factor influencing the labor force of the country. one percent decrease in the age dependency lead to increase the labor force participation of the country by 18 percent. Moreover, gross capital formation and health expenditure are positively (0.114704), (0.098212) and significantly (0.0118), (0.0196) related to the labor force participation of the country. Elaborating this it is stated that change in the gross capital formation brings change in the labor force participation. From the result it is cleared that one percent increase in the gross capital formation which is an increase in the fixed capital result to increase the participation rate of the labor force by 11 percent. Similarly, health expenditure is also the prevalent factor in nexus with the labor force in the country. Table of the long run association presents that one percent increase in the expenditure of health result to increase the labor force participation of the country by approximately 10 percent. This usually means that increasing health expenditure provides good health to the peoples which encourage them to take part in the labor force.

In addition, the same table of long run relationship presents that secondary school enrollment and trade openness have positive and statistically significant long run relation with the labor force participation. Result presents that secondary school enrollment has positive (0.179798) and significant (0.0136) relation with labor force supply. This means that one percent increase in the enrollment of secondary education may result to increase the labor force participation by 17 percent. Increase in the school enrollment enhances the education of the country which maximize the labor force and economic development of the country. In the same way, trade openness has also positive (0.120482) and significant (0.0062) association with the labor force. This positive relationship means that one percent increase in the trade openness result to increase the labor force participation by more that 12 percent. Increase in trade openness enhance and strengthen the economic condition of the country which lead to increase investment and create opportunities for the citizens. Increase in labor opportunities maximizes the labor force of the country. Similarly, the remaining three variables that are infant mortality rate, life expectancy and population per bad doctor are the insignificant variables in association with the labor force participation of the country.

3.3 The Bound ARDL Test

Table 4. Bound cointegration test

Significance	Lower Bound I(0)	Upper Bound I(1)
10%	1.95	3.06
5%	2.22	3.39
2.5%	2.48	3.7
1%	2.79	4.1
F-Statistics	**7.181842**	

For the more confirmation regarding the long run relationship of explanatory variables with labor force participation. This study used the Bound test in which the F-statistics value is considered to be more significant and effective. So, the F-statistics is has to decide the long run relationship of explanatory variables to the explained variable. The critical value for F-statistics taken from (Pesaran, Shin, and Smith 2001), shown in table 5. Moreover, based on the result of the bound test (F-statistics) which is utilizing the auto regressive distributed lagged (ARDL) approach. Finding of the test unveil the significant fact and proof for the existence of long run relationship of labor force participation to the rest of indicators used in the current study. Concluding, the null hypothesis proposed for the bound test which is $Ho: \alpha = \beta 1 = \beta 2 = \beta 3 = \beta 4 = \beta 5 = \beta 6 = \beta 7 = \beta 8$ and states the presence of no cointegration of labor force participation with other indicators cannot be accepted. Similarly, the current study has to accept the alternative hypothesis of the bound test which states $H1: \alpha \neq \beta 1 \neq \beta 2 \neq \beta 3 \neq \beta 4 \neq \beta 5 \neq \beta 6 \neq \beta 7 \neq \beta$ that there is long run cointegration or association exists between the labor force participation and other set of variables for the public health policy.

3.4 The Result of the Model Selection, Akaike Information Criterion (AIC)

In order to chose the most appropriate and relevant model for the current study to examine the nexus of participation rate of the labor force and public health policy, the Akaike information criterion (AIC) developed by (Akaike, 1974) is used. This method means the AIC got preferences over the Bayesian information criterion (BIC) as AIC filters and eliminates the unnecessarily complicated models. Akaike information criterion (AIC) is equal to measurement of the in-sample error of the estimated model. This usually means that true forecasting error on the proposed data set used in the current study. Similarly, the AIC outcome to take decision regarding the model selection. According to rules, the lowest value of the Akaike information criterion (AIC) leads to the most fit and suitable model.

Table 5. Result of model selection akaike information criterion (AIC)

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
1	160.498970	-6.395301	-5.453264	-6.047907	0.899462	ARDL(2, 0, 2, 2, 2, 2, 0, 2, 2)
2	158.699672	-6.358124	-5.457045	-6.025834	0.895892	ARDL(2, 0, 2, 2, 1, 2, 0, 2, 2)
3	158.626619	-6.354726	-5.453647	-6.022436	0.895537	ARDL(1, 0, 2, 2, 2, 2, 0, 2, 2)
4	160.515340	-6.349551	-5.366555	-5.987052	0.894251	ARDL(2, 0, 2, 2, 2, 2, 1, 2, 2)
5	161.514246	-6.349500	-5.325546	-5.971897	0.893444	ARDL(2, 0, 2, 2, 2, 2, 2, 2, 2)
6	160.508824	-6.349248	-5.366252	-5.986749	0.894219	ARDL(2, 1, 2, 2, 2, 2, 0, 2, 2)
7	153.334015	-6.341117	-5.644829	-6.084347	0.892076	ARDL(1, 0, 0, 2, 2, 0, 0, 2, 1)
8	157.216914	-6.335670	-5.475549	-6.018484	0.893528	ARDL(1, 0, 2, 2, 2, 1, 0, 2, 2)
9	157.140408	-6.332112	-5.471991	-6.014926	0.893149	ARDL(2, 0, 2, 2, 0, 2, 0, 2, 2)
10	159.105210	-6.330475	-5.388438	-5.983081	0.892729	ARDL(1, 0, 2, 2, 2, 1, 2, 2, 2)
11	160.076553	-6.329142	-5.346147	-5.966644	0.892071	ARDL(1, 0, 2, 2, 2, 2, 2, 2, 2)
12	158.073017	-6.328978	-5.427898	-5.996687	0.892813	ARDL(2, 0, 2, 2, 2, 1, 0, 2, 2)
13	151.993771	-6.325292	-5.669961	-6.083626	0.889389	ARDL(1, 0, 0, 2, 2, 0, 0, 2, 0)
14	158.974607	-6.324400	-5.382363	-5.977006	0.892075	ARDL(2, 0, 2, 2, 0, 2, 2, 2, 2)
15	155.944390	-6.322995	-5.503832	-6.020913	0.891948	ARDL(2, 0, 1, 2, 2, 0, 0, 2, 2)
16	158.835589	-6.317934	-5.375897	-5.970540	0.891375	ARDL(1, 0, 2, 2, 2, 2, 1, 2, 2)
17	153.828952	-6.317626	-5.580379	-6.045752	0.890314	ARDL(1, 0, 1, 2, 2, 0, 0, 2, 1)
18	157.824904	-6.317437	-5.416358	-5.985147	0.891568	ARDL(2, 0, 2, 2, 0, 2, 1, 2, 2)
19	159.801502	-6.316349	-5.333354	-5.953851	0.890681	ARDL(1, 1, 2, 2, 2, 1, 2, 2, 2)
20	**158.798209**	**-6.316196**	**-5.374158**	**-5.968802**	**0.891186**	**ARDL(2, 0, 2, 2, 1, 2, 1, 2, 2)**

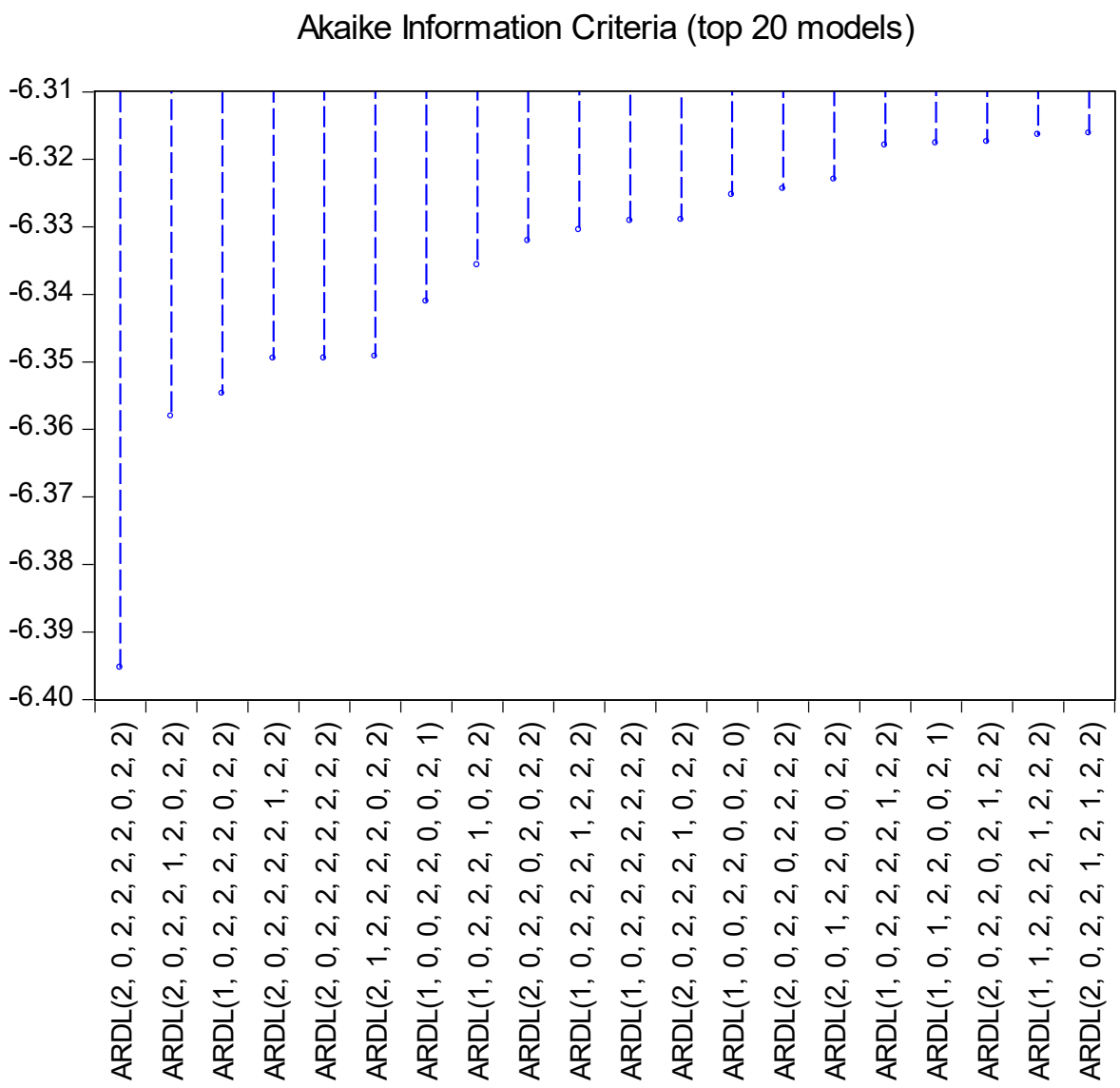

Figure 3. Appropriate model selection for the study

3.5 Result of the Stability Test

The current study also used the cumulative sum of recursive (CUSUM) and cumulative sum of square of recursive (CUSUMSQ) to examine the stability of short and long run association among variables used. These tests are established and used by (Brown, Durbin, and Evans 1975) for confirming the short and long run relationship. Proposed null hypothesis of these test presents that there is stable short and long run nexus among the dependent variable and independent variables. While, the alternative hypothesis present and states that there is no stable short and long run relationship exist. The following figure exhibit results of these tests and also leads to accept/reject the null hypothesis.

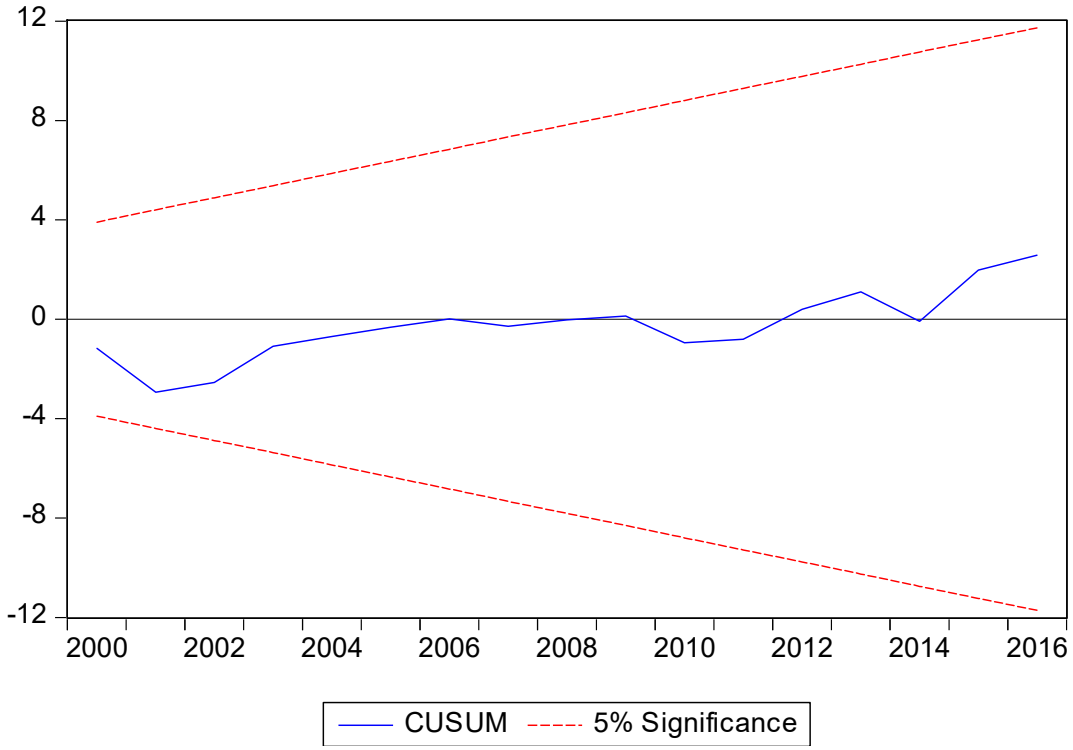

Figure 4. Graphical representation of cumulative sum of recursive residuals (CUSUM)

Figure exhibit outcome of cumulative sum of recursive residuals (CUSUM) and confirm that the plot of (CUSUM) fall within the 5% level of significance. This result indicates that the study has to accept the null hypothesis of stability against the alternative hypothesis of unstable association. Acceptance of the null hypothesis unveil the fact and presents that labor force participation has stable short and long run association with other indicators of public health policy. Moreover, the stable short and long run association display the value and importance of public health policy in the society. For more confirmation the study also used the cumulative sum of square of recursive residuals which can be shown as;

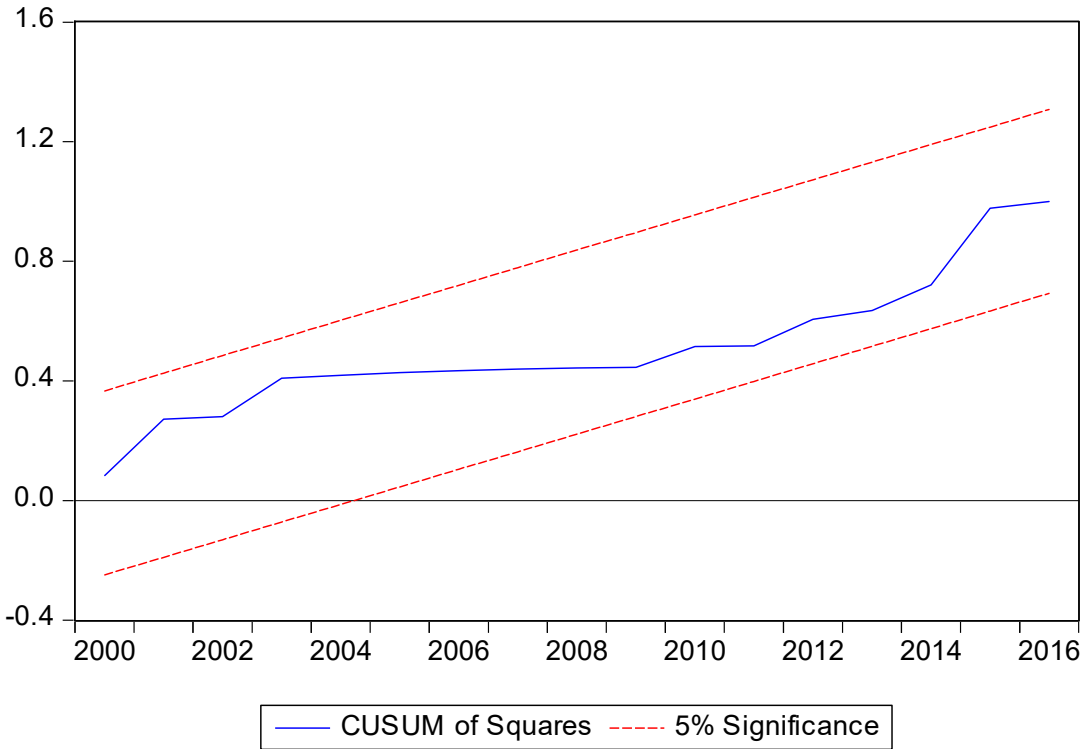

Figure 5. Graphical representation of cumulative sum of square of recursive residuals (CUSUMSQ)

Figure exhibit the outcome of cumulative sum of square of recursive residuals (CUSUMSQ) and again confirm that the plot of (CUSUMSQ) fall within the 5% level of significance. Result indicates that the study has to accept the null hypothesis of stable short and long run nexus of parameters against the alternative hypothesis of unstable association. Acceptance of the null hypothesis unveil the fact and presents that labor force participation has stable short and long run association with other indicators of public health policy. So, both of the graph confirms that the short and long run association of the ARDL are stable and reliable.

3.6 Result of the Stationarity Test

It is mandatory to examine the time series data for stationarity and this study apply the unit root test for examining the stationarity of data. The time series data is considered to be stationary if its mean, variance and covariance remain constant all the time. The most simple and statistically pure time series model is autoregressive on order one model or AR(1) model. The following table disclosed the stationarity of data used in the study.

Table 6. Result of the data stationarity

Variable		T Stat	P Value	Conclusion
LnLFP	Constant	-0.84	0.40	I(1)
	Ist Difference	-6.20	0.00	
	Trend and Constant	-2.36	0.39	
	Ist Difference	-6.20	0.00	
LnHE	Constant	-1.51	0.51	I(1)
	Ist Difference	-6.83	0.00	
	Trend and Constant	-1.56	0.78	
	Ist Difference	-6.81	0.00	
LnAD	Constant	-1.11	0.70	I(1)
	Ist Difference	-5.51	0.00	
	Trend and Constant	-0.10	0.99	
	Ist Difference	-5.75	0.00	
LnPPD	Constant	0.18	0.96	I(1)
	Ist Difference	-10.8	0.00	
	Trend and Constant	-3.49	0.15	
	Ist Difference	-10.7	0.00	
LnLE	Constant	-3.31	0.12	I(1)
	Ist Difference	-2.70	0.08	
	Trend and Constant	-4.21	0.20	
	Ist Difference	-3.74	0.03	
LnIMR	Constant	1.07	0.99	I(1)
	Ist Difference	-10.6	0.00	
	Trend and Constant	-4.96	0.20	
	Ist Difference	-6.20	0.00	
LnSSE	Constant	-0.38	0.90	I(1)
	Ist Difference	-3.91	0.00	
	Trend and Constant	-2.04	0.56	
	Ist Difference	-3.89	0.02	
LnTO	Constant	-2.40	0.14	I(1)
	Ist Difference	-7.55	0.00	
	Trend and Constant	-2.49	0.32	
	Ist Difference	-7.57	0.00	
LnGCF	Constant	-3.85	0.20	I(1)
	Ist Difference	-7.68	0.00	
	Trend and Constant	-3.61	0.13	
	Ist Difference	**-7.57**	**0.00**	

Source: Author.

Table 6, presents the stationarity of data which is mandatory for relying on any sort of result. Therefore, this study used the ADF for confirming the absence of unit root in the data. The

same test is used by other researcher dealing with the time series data in the corresponding fields like (Khan & Ullah, 2019; Tiwari, Shahbaz, & Hye, 2013; Shahbaz et al., 2013). Mostly time series data are trended having unit root problem which result in spurious ordinary least square (OLS) estimate, (Granger, 1969).

Result of the Augmented Dickey Fuller test in table 4.6, shows that each and every series used in the study is non-stationary when these variables are at level. This means that data poses unit root issue at level and hence the study cannot rely on the OLS estimates. However, when each and every series are checked as first differences or I(1), than all the series are found to be stationary and eliminate the unit root issue here. Therefore the current study rejects the null hypothesis of non-stationary and accepts the alternative hypothesis of stationary data with significance level of 1 percent and 5 percent. Finally it is suggested that all the series used for the association of public health policy and labor force participation in Pakistan are stationary at first difference or I(1) based on the augmented dickey fuller test (ADF). So, concluding that finding of all the ordinary least square (OLS) of the current study can be relied because it obey the basic assumption of the OLS estimators of stationarity in the data used for the relationship.

3.7 Variance Decomposition of the Study

The current research utilized the variance decomposition for the shocked influence. This is a statistical technique which is usually based on Cholesky procedure. Usually, the variance decomposition separates the variation which take place in the explained variable of the current study into parts of shocks within the autoregressive (VAR) (Lütkepohl, 1988). This actually presents that it identifies and exhibit that what proportion of change in a specific indicator can be attributed to variate in the independent variable of the study. Like previous (Durlauf & Blume, 2016; Stock & Watson, 2002; Forni et al., 2000), this research is also motivated to look and unveil at the individual result which result for the individual characteristics and characteristics of the group to which the individual belongs. In short is simply presents that how much the outcome variable is explained by the explanatory variables used in the study. The following table briefly exhibits the shock and its influence on the outcome variable. The following table briefly disclosed the variance decomposition of the labor force participation in Pakistan using VAR techniques.

Table 7. Result of the Variance decomposition

p	S.E.	LFP	AD	GCF	HE	IM	LE	PPD	SSE	TO
1	0.370173	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.416861	79.22735	2.115380	2.480450	0.339808	9.428822	0.015913	2.530194	2.370082	1.492001
3	0.581547	41.08836	2.484444	1.910416	2.099997	5.158186	4.229310	7.354234	31.77814	3.896915
4	0.706037	28.74196	6.895414	1.467371	2.729474	3.603265	4.640546	9.820805	39.39560	2.705566
5	0.781243	24.02743	8.101325	2.255072	8.008652	4.273899	4.145505	8.475624	37.75904	2.953460
6	0.822227	22.07328	8.161542	3.332659	12.00917	5.231607	3.748135	7.767706	34.18472	3.491189
7	0.847024	21.41804	7.706540	3.174607	12.57317	5.403522	4.192926	7.843057	34.25568	3.432462
8	0.882375	19.89439	7.573481	3.638676	11.83059	5.078602	5.080940	8.482942	35.20926	3.211113
9	0.945412	17.33260	8.217907	5.380157	13.36761	4.428852	5.746051	8.890545	33.76905	2.867231
10	1.010372	15.36656	9.698162	7.224545	16.05692	3.986490	5.789796	8.586680	30.73704	2.553805

Source: Author.

Table 7, presents the variance decomposition of for the explained variable of the study. The variance decomposition usually exhibits the variation in the targeted variable that how much variation is due to its own shock and how much other variables play role in the variation of the targeted variable. Labor force participation is the explained variable of the study whose variation can be checked through its own shock as well as variation of the explanatory variables of the study. The first column of the table present period while other present dependent and independent variables of the study. Starting from period two, it is shown that 79.22 percent of variation in the labor force participation is explained by its own variation. Simply, we can say that majority of the variation in the labor force is due to its own shock while other are also influential. Moreover, the other explanatory variables also variate in the labor force participation in Pakistan. Table presents that 2.11 percent's of the variation in the age dependency contribute to total variation in the labor force participation.

Result of the table also disclosed that gross capital formation, health expenditure, infant mortality rate, life expectancy, population per bad doctor, secondary school enrollment and trade openness are contributing in the variation of labor force participation by 2.48%, 0.33%, 9.42%, 0.01%, 2.53%, 2.37% and 1.49%. Similarly, in period three, it is shown that 41.08% of the variation in the labor force participation is due to its own variation or its own shock. Moreover, other explanatory variables also show significant contribution in the variation of the labor force participation on Pakistan. Table presents that contribution of age dependency in the total variation of labor force participation by 2.48%. Moreover, gross capital formation, health expenditure, infant mortality rate, life expectancy, population per bad doctor, secondary school enrollment and trade openness are contributing in the variation of labor force participation by 1.91%, 2.099%, 5.15%, 4.22%, 7.35%, 31.77% and 3.89%. This confirms that not only labor force participation by itself bring variation but the entire explanatory variables are also influencing and contributing well in the variation of labor force participation is Pakistan. Similarly, variance decomposition of the labor force participation for the entire periods also shows that labor force participation is variate by its own shock as well as by other explanatory variables.

4. Discussion

The current study examined the influence of public health policy on the participation rate of labor force in Pakistan. The study relies on time series data and used eight indicators to measure the public health policy. Result of the study presents that most of the indicators have short and long run relationship with the labor force participation in Pakistan. Finding of the study commence with age dependency of peoples and labor force participation. Age dependency is usually pressure on the productive population of the country, so decrease in such pressure enhance the labor force participation of the country. Result are align with the finding of previous studies of (Rauf et al., 2018; Mushtaq, Mohsin, & Zaman, 2013; Dogrul, 2015; Vicens-Feliberty & Reyes, 2015). Dependency ratio usually influences the labor force participation of women because mostly populations are dependent on female in a society. Moreover, female labor force declined when majority of children are dependent over them and this finally contribute in the decline of entire labor force in the country. In Pakistan, instead female education is far away from standard level but it is increasing day by day. Increase in the female education play a significant role in building society in the country. As an old proverb states that "an educated woman educates a family", because she is the first lyceum for each child. In addition, she know how to nurture a child therefore such kind of educated women practice family program for the bright nurture of child.

Among those indicators, the promost and prevalent factor is the expenditure on health. The study exhibit that health expenditure has positive and significant association with the country's labor force. Finding of the current study is consistent with the previous studies of (Dogrul, 2015; Faridi, Malik, & Ahmad, 2010; Ghatak & Madheswaran, 2014; Rauf et al., 2018; Mushtaq, Mohsin, & Zaman, 2013; Manton et al., 2007; Pellegrini, Rodriguez-Monguio, & Qian, 2014; Zohaib Ali, 2017). Some finding presents that health expenditure has no influence on the labor force participation (Dwyer & Mitchell, 1999), however most of the studies deny the negative nexus between health and labor force. Good health is the birthright and basic need of each individual living everywhere. Peoples living in different countries have approximately similar demand for their health; however, the government policy and interest may vary. Investment on health facilities is one of the prevalent factors affecting the entire labor force participation. Designing friendly policies and providing well facilities for the good health of individuals motivate the labor force market.

Result of the study also presents that secondary school enrollment has positive influence on the labor force participation in Pakistan. Increase in the education maximizes the opportunity for the people to take part in the labor force of the country. Finding of the study is consistent with the previous studies of (Rauf et al., 2018; Zohaib Ali, 2017; Mushtaq, Mohsin, & Zaman, 2013; Chaudhary, Iqbal, & Gillani, 2009; PATRINOS, 2016; Faridi, Malik, & Ahmad, 2010; Spielauer, 2014; Hedley, 2003; Heath & Jayachandran, 2016; SANUSI, 2016; Bowen & Finegan, 2015). Education is one of the prevalent factors in determining the human capital formation and also in relation to income and labor force participation. Education is considered is the most vital and foremost source for the human capital formation which further result to maximize production as production is directly linked to the human capital formation (Lucas Jr, 1988). In addition, labor force participation of individuals directly linked to the remuneration, however well remuneration is the outcomes of good education (Yuxiao,

2010).

Education is the most prevalent factor affecting the living standard of peoples (Takahiro Ito, 2009). Education is the most vital area in the human life as it gives us knowledge of the world around us and alters it into something good. Education usually creates in us a perception and motives of looking at life. Moreover, it helps us build opinions and have variate points of view on things happened in life. Worth of education can be confirmed from the quotes of well known Nelson Mandela "Education is the most important weapon that you can use to change the world" (Ali, 2018). This study confirms that education is a stronger determinant of human capital which results to enhance ability and creativity of peoples.

This study presents that in general, trade openness affects the incentives of agents to enter or exit the labor market and this result to bring change in the unemployment rate of the country. This is due to the fact that trade openness usually maximizes expectation of the labor in the exporting industries. Trade openness derived from export and import of the country which is the main indicators for the economic development. So, trade liberalization brings dramatic increase in the labor force participation which results to enhance the living standard of peoples and hence economic development of the country is possible. This finding is confirmed by (Madanizadeh & Pilvar, 2019). In Pakistan trade liberalization is usually affected by the government policies and priorities. As it affects the labor market and economic development, but so far none of the government takes it serious. However, in the developing countries the political institution like democracy, political right and civil liberties can play an influential role in the nexus between labor force and trade liberalization (Cooray, Dutta, & Mallick, 2017).

Result of the study also disclosed that increase in the fixed assets or gross capital formation has positive and significant impact on the labor force participation in Pakistan. The same finding of the current study is in line with the previous studies of (Rauf et al., 2018; Mushtaq, Mohsin, & Zaman, 2013; Zohaib Ali, 2017; Ghatak & Madheswaran, 2014; Bowen & Finegan, 2015; Hotchkiss & Rios-Avila, 2013; Juhn & Potter, 2006). The concept of gross capital formation begins very earlier and it comprise of both tangible and non tangible goods. Tangible include plant, tool and machinery while intangible goods are well education, health and scientific knowhow. Capital accumulation of both have significant nexus with labor force and hence with the economic development. Usually, physical capital accumulation maximizes the level of production in the country which is considered to be the key factor for increasing labor force. This study confirms the importance of capital formation. However, form domestic point of view capital formation not only means to additions in the areas of constructions, equipment and inventories within the country. Usually capital formation means the other capital expenditures Capital accumulation is often related with the investment either from profit, income or savings, especially in real capital goods. Government need to enhance the c formation which refers to real investment and this may further considered as a means of production. Because such investment will result in increasing the capital stock and investment in financial assets represented on paper.

This includes yielding profit, interest, rent, royalties, fees or capital gains, all these significantly enhance the labor force due to the fact that increase in profit lead to increase investment and hence labor supply. Moreover, on the other hand government should also

practice significantly the investment in non-productive physical assets such as residential real estate that appreciate in value. Similarly, human capital accumulation, like in the shape of new education and training which result increasing labour force and also improve the skills of the (potential) labour force which increase earnings from work. In addition, government does not need to apply the whole of its current productive practices to the needs and desire of the immediate consumption. However, country needs to direct a part of it capital formation, such as tools and instruments, machines and transport facilities, plant and equipment, etc. In other words, it is the diversion of a part of society currently available resources to the purpose of increasing the stock of capital goods so as to make possible an expansion of labour force and consumable return in the coming time. In essence, gross capital formation/accumulation is usually a synonymous to investment and investment is the prevalent factor for increasing the labour force.

Current finding are consistent with the study of (Ongo & Vukenkeng, 2014; Qin et al., 2006; Al-Sadig, 2013; Naceur & Ghazouani, 2007; Jiranyakul, 2014). Pakistan usually faces the labour force participation issue instead of having abundance strength and power in both male and female labour market. These indicators are very essential for the government to take it serious while designing policy for the public. Because, availability of these indicators are rare and beside this, there is also high distinction for male and female in availability of these resources. Female are in same ratio to male in Pakistan but so far only 25% of female are involved in the labour force which result in decreasing the accumulative labour force in Pakistan. There are a lot of reason which unveil that why female are actively involving their selves in the labour market of the country. Government of Pakistan need to focus on these reasons and take in priority basis to resolves all these in order to increase the labour force participation rate and development of country's economy as well.

5. Conclusion

The study relies on the secondary time series data which is mostly collected from the most prominent sources that are World Bank Indicators and Pakistan Bureau of Statistics. This study collect time series data for the period of 45 years that are from 1972 to 2016 in order to presents a comprehensive description of the labor force participation and public health policy in Pakistan. For the short and long run association, the study used auto regressive distributed lagged (ARDL) and bound ARDL tests. The data is also passed through various diagnostics test for the basic assumptions of classical linear regression model. Violation of certain assumption will result the finding inefficient and one's cannot rely on it. Moreover, stationarity of data is also checked through Pesaran test and finally the stability of residuals are also examined and check for the accurate confirmation of short and long run relationship. Applying these, the study found that most of the indicators related to health have significant influence on the labor force participation in Pakistan.

Specifically, result presents that expenditure on health has positive impact on the labor force supply. Availability of basic health facilities to each individual enhances their living standard and as a result these peoples have time to involve themselves in the labor market. Enrich labor market of the country dramatically maximize and improve the economic development of the country. Most of the country offered insurance based employment which is considered to be the most attractive factor for maximizing labor force in the developed countries.

Similarly, finding further presents that school enrollment has also influential effect on the labor force of the country. Education is one of the basic factors in defining the human capital formation and also in relation to income and labor force participation. Education is considered is the most vital and foremost source for the human capital formation which further result to maximize production as production is directly linked to the human capital formation. Government needs to increase investment on education and maximize the school enrollment, this will result to enrich the labor market and hence achieve economic growth.

Through ARDL, result also shows that trade openness has both short and long run influence on the labor force participation in Pakistan. This study suggests that government must design friendly policy for investors and local traders to bring trade liberalization and widen the business market. The current global situation of connecting with the world requires not only engaging in the global business and financial flows but also needing to sustain in the international market. To achieve this, government need to provide friendly environment to investors. Government also needs to design policies for friendly trade in conjunction with growth enhancing and inflation targeting policies which will result to achieve economic development of the country. Trade openness enhances investment and enriched market in the country which result in increasing labor force participation. Result of the study also presents that gross capital formation has influential relationship with the labor force participation of country. Gross capital formations accelerate investment in the country which results in labor opportunities. Therefore, government needs to direct a part of it capital formation, such as tools and instruments, machines and transport facilities, plant and equipment, etc. In other words, it is the diversion of a part of society currently available resources to the purpose of increasing the stock of capital goods so as to make possible an expansion of labour force and consumable return in the coming time.

6. Implication of the Study

Each study has main objective to contribute in existent literature as well as in the underpinning theory which the study used. This study examined the impact of public health policy on the labor force participation in Pakistan. The study keenly contributes to the human capital theory established by (Becker, 1964), considered as a base for each individual as it focused on various factor for improving human life. Moreover, human capital theory is closely associated with the human resource, but this theory ignores the factor that it is the income condition which improves the living standard. More precisely, these factors mentioned by human capital theory make the individual healthier which result in taking active part in the labor market. Similarly, individual in labor market earn well which helped in improving the life standard. In same way this study also focused on the labor force participation which is mostly depends on the individuals attributes comprise of various things. These may include health condition, individual's education and economic condition of the country.

Practically the current study contributes in various ways. Like, health is the most prevalent factor in an individual labor supply decision. Because, health is not only the form of human capital (Grossman, 1972), but also individual preference between work and leisure may change due to health shocks. Moreover, economist across the world believe that well health contribute significantly to the labor force and human capital and hence toward the economic

growth. Health factor must be considered by the government policy maker, because it is directly linked to the individual wellbeing and contribute to the economic performance of the country (Heller, 2007). This study also helped to the policy maker to focus on the dependency ratio while designing policy as it is considered as an obstacle for the economic development. This study further helped the government to invest in providing good health facilities to individuals. Like availability of doctors, basic health facilities and other are providing to each individual.

Similarly, this study confirms the role of investment in relation to labor force. So, investment as a percentage of GDP must be carried out for the developmental purposes instead of non-developmental work. For that the government needs to design friendly policies for the investors to enhance labor force participation in the country (GoP, 2012). Finally the government must take serious the education system of the country. Because, education is the basic need as well as has influential role in the individual life. One's said that education is the most powerful weapon through which you can achieve economic success. Education aware each individual regarding life standard, it also helped to take part in the labor force. This result is good earning and well management of the family, because growth in a population is also crucial. The policy maker must also keep the role of education in population size, growth rate and other attribute to estimate the quantity of goods and services that will need to meet the future demand (Bloom DE, 2011).

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