

The Impact of Population Growth on Economic Development in Pakistan

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Abstract: This study empirically tests the impact of Population growth on Economic Development of Pakistan for period of 1975-2008. Demographic transition helps in creating policy Environment that takes maximum advantages of demographic potential of the country. ARDL technique was incorporated to investigate the population and economic development relationship. The result of the model shows that the impact of population is positive and significant but the problem associated with huge population growth is the flood of newly produce work force, its management and providing different facilities even basic needs become a challenge for government and policy makers. To tackle this issue this study incorporated unemployment rate and expenditure made on health and education to the model in-order to investigate the impact of population growth directly and indirectly on economic growth in Pakistan. The results of the study indicate that Population growth has positively and significantly contributed to economic development but negatively affected by unemployment rate. HRD is although positive but insignificant. What can be concluded is that the direct impacts of population growth is positive on development of the economy but reverse is the case when indirect analysis is made and that leads to unemployment. Now although on one hand if it increase growth but on the other hand it creates a problem of unemployment and leads to lacking of educational and health facilities. The government is advised to utilize this additional workforce efficiently as a policy tool to achieve high and desired level of growth.

Key words: Population growth • Economic development • Unemployment rate • HRD • ARDL • Pakistan

INTRODUCTION

Debates on the relationship between population growth and economic development have since Malthusian population trap (1798). According to Malthusian population trap.

- Population increases geometrically (doubles, then again doubles)
- But food production increases more slowly
- So eventually, there is not enough food
- And something happens to reduce the population to match the food Supply e.g. Starvation, disease, war etc.

There are generally two strands of views about the impact of population growth on economic development;

one view opposing population growth that population growth is a real problem while the other view is in favor of population growth. Both of the viewers present arguments for their views. The first view of population growth and economic development started from the Malthusian population trap is the well-known theory of the relationship between population growth and economic development.

- The impact of population growth is deteriorating on economic development by hampering economic growth and considers it is a real problem.

The followers of the first view argue based on population-poverty cycle theory. Rapid population growth gives way to negative economic consequences and this should be a real concern for the developing

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countries, because population growth retards prospects of a better life for the already born by reducing savings rate at the household and national levels.

- Secondly population is desirable not a problem. It is one of the basic factors of production.

According to this view population growth is the real strength and power of a country. High population growth means high labour supply that leads to division of labour and economic growth. Both the stands of views present their arguments about population growth and economic development. Each of the views is supported both theoretically and empirically.

Population Growth is a Real Problem: According to this stand of view, Population growth is one of the important social, economic and political serious problems. This view is started with the Malthusian population trap. An increase in the number of people has large serious effects on different aspect of human lives in the prevailing economy, such as social structures and social values, markets performances, education, the environment and unemployment. In 1990 an estimated 76.9 per cent of the world's population lived in developing countries and this share is expected to increase to 83.2 per cent by the year 2025 [1].

[1] Population Reference Bureau, World Population Data Sheet, New York, 2005.

Pakistan is one of the developing countries which faced the problem of rapid population growth. The population of Pakistan increased from 39,448,232 of 1950 to 172,800,051 of 2008. This increased is more than four times from of independence. At the time of independence, combined Pakistan that included former East Pakistan (Bangladesh) was the 13th most populous country in the world with a population of 32.5 million but in 1996 it was 7th with a population of 140 million solely in Pakistan. But today in 2008 Pakistan is the 6th most populous country in the World with a population of 172 million. There is continuous increase in population of Pakistan because of sustained high fertility and declining mortality due to the advancement in medical resources and its availability. Pakistan has the highest birth as well as fertility rate among the Asian countries [2].

This is alarming and requires immediate attention and action. Pakistan's population has grown at an average rate of about 3% per annum since 1951 to the mid of 1980s but it decreases to an average rate of 2.6% per annum

during the last fourteen years of the 20th century and from the start of the 21st century it is growing at an average rate of almost 2% per annum. If Pakistan's population grown at 2% since 1960, Pakistan's per capita income would have been Rs. 64366 as against Rs. 43748. During the last five decades 1950- 2001, Pakistan's population has increased more than 4 times, whereas the population of South Korea increased only 2.4 times. Over the same period per capita income in Pakistan increased by only five times from \$79 in 1950 to \$503 in 2001, whereas in South Korea it increased by 129 times. Pakistan's population growth rate is 2.8% which is highest in Asia. From the time of independence of Pakistan added a million people every year, but today in 2008 we are adding a million people in every three months four times increase in absolute number. In such situation no development plan can sustain such a population growth rate [3].

This evidence makes obvious the nature and severity of population problem. Since 1960s different governments have made serious efforts to check the bulk of population growth but these efforts have not succeeded. Because the common man has a phobia of practicing birth control mainly due to religious and social reasons and cultural factors [4]. Here we present some evidences to provide a clear cut image of Pakistan economy in respect of huge population growth (net increase in total population).

Rural Urban Migration and Population Density:

In absolute numbers almost 128 millions persons have been added during the period of 1951-2008. The population density has increased more than four times from of 42.5 persons per square kilometer in 1951 to 203 persons per square kilometer in 2008. Rural-urban migration has swelled over the years due to push and pull factors and the urban Population has increased from 6 million to 57 millions during the same period. This situation has exerted pressure on the basic need like supply of food, energy, health, educational faculties and infrastructure like housing, transportation, water, sewerage.

Sex Ratio: Sex ratio has declined over the years, which is shown in Table 3. It declined from 116 in 1951 to 115 in 1961 and to 114 in 1972 and 110 in 1981 and 107 in 2008 implying that the frequency of females has followed an increasing trend. This shows the decrease in sex ratio in Pakistan, which can generate problems and disturbed daily life. Polygamy will make the confusion worse

Table 1: Demographic Indicators- Pakistan and Asian Countries

Country	Population (Millions) Mid-2005	Births per 1000 Pop	Death per 1000 Pop	Infant Mortality Rate	Total Fertility Rate	Income
Pakistan	162.4	34	10	85	4.8	21601
India	1103.6	25	8	60	3.0	3100
Bangladesh	144.2	27	8	65	3.0	1980
Indonesia	221.9	22	16	46	2.6	3460
Philippines	50.5	22	10	75	2.7	--
S. Korea	48.3	10	5	5	1.2	20,400
Thailand	65.0	14	7	20	1.7	8020
Japan	127.7	9	8	2.8	1.3	30,040

Source: Population Reference Bureau, World Population Data Sheet, New York, 2005.

Table 2: Gender Composition and Sex Ratio by Area Pakistan, 1951-2008

Years	Sex Ratio		
	Urban	Rural	Total
1951	127	115	116
1961	126	112	115
1972	120	113	114
1981	115	109	110
1998	112	107	108
2005	108	107	107
2008	108	107	107

Source: Population Censuses 1951, 1961, 1972 and 1998 National Institute of Population Studies (NIPS) estimates of population for 2005 to 2009.

confounded. In order to overcome the problem of sex ratio, we have to, increase in female literacy rate, provided reasonable jobs and enhancement of women social status appear to be an agreeable solution.

Poverty and Inequality: Poverty and income inequality are the direct as well as indirect result of the above mentioned factors. Thus rapid population growth is one of the important problems of Pakistan. For better Socio-economic conditions population would be grow slowly.

Pressure on Natural Resources: Pakistan is an agriculture country but agriculture is the mainstay of Pakistan's economy. The arable land and almost all crops in Pakistan rely on irrigation. Supplies of both arable land and fresh water are stagnant; there is a question on Pakistan's ability to provide food and become self sufficient. Population pressures are alarming for arable land, forests and water resources. The size of arable land has decreased due to population pressure, inadequate arable land reforms and inheritance patterns. Before the mid of this century, Pakistan is projected to face a scarcity

of arable land with even less arable land available per person than in China. Limited fresh water supplies may be the biggest resistance in the way of increasing Pakistan's food supply [5].

Population Growth Is Desirable Not a Problem:

According to this view population is the real wealth and strength of the country. High population growth rate means high labour force which is one of the important factors of production i.e.

- $Y = f(L, N, K)$ (1)
- $Y = \text{Out put}$
- $L = \text{Land}$
- $N = \text{Labour}$
- $K = \text{Capital}$

From (1) we know that high the number of labour force high will be output of a particular production process. Here this study identified the following general arguments on the part of people who assert that population growth is not a cause for concern: The population is not a problem but some others issues, Underdevelopment, world resource depletion, Population distribution and Subordination of women. According to this view the under development is the real problem, which is a gift from the developed world to developing world. If the correct policies are pursued and lead higher level of living, greater and expand freedom, population will take care of itself. The second argument is that 80% of world resources are consumed by the people of the developed nation the only 20% of the world population. The third argument is the distribution of population, there is very high unequal distribution of population between villages and cities which is the problem. The fourth argument is that Women have inferior role, poor education, lack of jobs and limited social mobility,

because of these dismal characteristics of the society in the underdeveloped countries poses serious problems for development. If these problems are solved then the population's growth will not be a real problem. With the increase in population growth there is an increase in the labour force, leads to low wage rate and lower will be the cost of production leads to economies of scale and is a result of which growth and development will occur [6].

The socio-economic condition in developing world is largely differs from the developed world e.g. the cost to have one child in a developed country is even larger than the cost of sixteen children in the developing world. According to this argument, though rapid population growth results in additional demand for food, clothing, shelter, social services like education and health and growing employment opportunities, the high population growth also adds to the labor supply that can be used for productive purposes and provides potential for large markets for goods and services and therefore large population affords a big opportunity to benefit from demographic dividend which can add to growth. Further they argue that population growth is not a real problem the real problem is the distribution of resources, 80% of the world resources are exploited by one-quarter of the world rich (developed) and the remaining 20% is used by about to three-quarter of the world population. They further add that there are some inefficient policies, miss-management and inefficient resource allocation, which are the basic cause for under development of large populous countries of the world [6].

Nobel Prize winner economist Kuznets (1956), as well as Boserup (1981) and Simon (1981) suggested many possible positive effects of Population growth, including economies of scale, acceleration of technological progress, flexible market responses to emerging shortages, induced institutional change, cheaper communication and transportation and easier collective social investments. Kuznets examined per capita income growth and population growth rates across nations and found no correlation, which seemed inconsistent with the Coale-Hoover view. His study was replicated by many others.

High population provides high number of labour force that might promote economic growth and leads to economic development. But the increase in labour force is not sufficient for economic growth. It is the high employment rate and Human Resource Development (HRD) with the increase in labour force that ensures economic growth. Increase in unemployment hamper economic growth the idea is presented by Oukn's law

(1962). This law stated that the variations in unemployment are inversely related to variations in output in any economy. It is mostly due to the fiscal indiscipline and mismanagement and inadequate policies that deteriorate economic development. The best example is China that has got tremendous economic growth with huge population. They have efficiently utilized their huge labour force for economic development with best allocation of other resources. China has got tremendous growth became a strong and powerful economy.

Statement of the Problem: Overall Pakistan's characteristics pose serious challenges for there development and not until Pakistan achieve considerable success in economic development, the nations development efforts will be frustrated with high population growth rate which is an open challenge for the management and policy makers. There annual population growth rate is among the highest in the world. It has floated around 3.4% to 2.7% since 1980 to 2000 and 2.04 in 2008 compared with the average rate of round about 1% for the developed world Afzal (2007). It is very much important to add here that the expenditure made on childe in the developed country is equal expenditure made on approximately 16 children's in the developing country [6]. High population also provides high labour force. If the high labour force engages in productive activities the nation will got high growth rate. The best example of high labour force use in productive process is China they have got tremendous growth which make the economy so strong and developed. Here in case of Pakistan the problem associated is of unemployment rate. It was about 3.2% in 1980's, 4.5% in 1990's and about to 6% in 2000's. For the foregoing, the following problems may be identified among others.

- High population growth increase the supply of labour force is the biggest challenge for the policy maker to manage the newly born labour force in productive activities.
- Pakistan has endowed with cheap laobur force but Pakistan has still not use the abundant cheap labour in productive activities and faces the problem of unemployment.
- The policies practiced by government are in right direction to enhance HRD?

Objective of the Study: The main objective of this paper is to examine the effect of population growth on economic development of Pakistan. Two new variables are used to

investigate the impact of development policies and government management and efficiency variables that might deteriorate economic growth. These variables are proxied by expenditure made on health and education and unemployment rate respectively.

Literature Review: Many researchers contributed to analyze the relationship between demographic and economic variables using time series as well as cross sectional data in different studies. This study reviews some of the studies available on the subject and found mixed evidence. Schultz (1985), used time series data (1860- 1910) of Sweden, has shown that a 25 percent decline in Fertility in Sweden was due to a 50 percent reduction in child Mortality.

[7] analyzed the impact of population growth on economic growth for Pakistan economy. His study consists over the 1951 to 2001. OLS estimation was incorporated and concluded that population growth had negatively contributed to economic development and considered population growth is real problem in case of Pakistan.

Shahzad *et al.* (2009) investigated the relationship between demographic variable and economic growth for the economy of Pakistan for the period of 1972–2006. They founded that the reduction in infant mortality rate and total fertility will help in accelerating the pace of economic growth in positive direction.

[8] examined for six Asian countries the relationship between population growth productivity and division of labour. He founded that population cannot explain productivity, he further explain that productivity is explained by the division of labor, which is determined by transaction efficiency. He suggests that Population growth can provide more scope for evolution in the division of labour that leads to productivity progress.

Kothare (1999) investigated the relationships between population growth and economic development for the economy of India for the period of 1988 to 1998. He concluded that India is one of the world's fastest growing economies, primarily due to the rise in population growth creating a positive effect on its long run economic growth. India is now ranked one of the top producers in agriculture and is a top nation in terms of GDP in a developing country. In many cases, economists are correct in saying that population growth has a positive effect on economic growth of a nation. In reality, economists might say, "If it weren't for its high populations India would still be a suffering developing nation.

Gill (1992) investigated the relationships between population growth and economic development for the economy of India. He concluded that population growth is good but up to some extent, while large population growth caused pressure on resources within the economy. Large population growth has negative impact on economic development.

Climent and Meneu (2003) investigated the relationships between demographic and economic variables for Spanish economy for the period 1960-2000. Bivariate Granger Causality has been examined to look short run relations. The results from the multivariate causality analysis and the Generalized Impulse-Response Function show that total fertility responds directly to GDP and Infant Mortality does not cause total fertility.

Arif and Nusrat (2008) analyzed the impact of human capital on economic development for the economy of Pakistan for the period of 1990 -2005. They conclude from their study that investment in human capital will leads to economic development in the urban area while dismal in the rural area particularly in female. Pakistan can benefited from investment in human capital and provide employment opportunity for the target to get economic development.

Mushtiq K investigates the relationship between population growth and per capita income for the economy of Pakistan, for the period 1960-2001, using Johansen's cointegration approach. The result shows that there is no long run relationship between population and per capita income.

Alam *et al.* (2003) analyzed the dynamics among fertility, family planning programmes and female education for Pakistan over the period 1965- 1998. The results are found to be consistent with theoretical statements that maintain that although in the long run the sufficient condition for fertility decline may be the result of complex dynamic interaction with planned family planning and significant socio-economic structural changes. Another study conducted for the economy of Ghana and found that population growth has negative impact on the four key variables like Education, Health, environment and economic sector.

MATERIALS AND METHODS

There are different studies related to population growth and economic development in the literature, different researchers have used different variables which affect economic development and related population growth also. This research study follows Afzal (2007).

He used the following model

$$Y_g = \beta_0 + \beta_1 POP_g + \beta_2 Inv_g + \beta_3 FI_g + \beta_4 EX_g + \beta_5 Ca + \mu \tag{1}$$

Where

- Y_g = real GDP growth
- POP_g = population growth
- Inv_g = real gross domestic investment growth
- FI_g = real foreign investment growth
- EX_g = exports growth
- Ca = private consumption as percentage of GDP
- μ = White noise error term.

This research study has adopted the same model with distinction of unemployment rate and Human Resource Development. The model is of the form.

$$Y = \beta_0 + \beta_1 PG + \beta_2 UN + \beta_3 HRD + \beta_4 TOP + \mu(F)$$

- Y = GDP Growth
- POP = Population growth
- UN = unemployment rate
- HRD = Human Resource Development
- TOP = trade openness
- μ = White noise error term

High population provides high number of labour force that might promote economic growth and leads to economic development. But the increase in labour force is not sufficient for economic growth. It is the high employment rate and Human Resource Development (HRD) with the increase in labour force that ensures economic growth. Increase in unemployment hamper economic growth the idea is presented by Oukn’s law (1962). This law stated that the variations in unemployment are inversely related to variations in output in any economy. Unemployment rate and Human

Resource Development are employed in this paper which is a consequence of mismanagement, fiscal indiscipline and inadequate policies. For example China has got tremendous economic growth with huge population, because they have efficiently utilized their huge population for economic development with best allocation other resources and in a very short time became a strong and powerful economy.

To find the impact of population growth, unemployment rate, Human Resource Development and important macroeconomic variable trade openness on economic growth the above mentioned equation (F) will be estimated by using ARDL co-integration technique.

Data Source: This paper has used the following variables in the model real GDP Growth rate, population growth rate, Labor force growth rate, workers Remittances growth rate and unemployment rate. The data are collected from “Economic survey of Pakistan” various versions, “Statistical supplement 2008-09” “Population census organization website and “Hand Book of Statistics”.

Empirical Findings: Before testing the impact of population growth on economic development, ADF test and PP are exercised in order to check unit roots in the series. The pre-testing of unit roots is not necessary for ARDL co-integration but ARDL technique is inapplicable in the presence of order second I(2). The results unit root process by using ADF and PP tests are given in the following table.

Unit Root: From table 3, it is clear that the variables except human resource development are integrated of mixed order I(1). The variable HRD is integrated of order I(0). Therefore ARDL technique could be used for the purpose of estimation. Steps in ARDL:

Table 3: Results of ADF and PP Tests

Variables	ADF test Statistics		PP-test Statistics		Order of Integration	Order of Integration
	Level	Ist Difference	Level	Ist Difference	(at 5% level of significance)	(at 10% level of significance)
GDP	-1.410 (0.558)	-4.16* (0.003)	-1.401 (0.610)	-4.120* (0.002)	I(1)	I(1)
UN	-0.156 (0.471)	-5.019* (0.002)	-0.128 (0.450)	-5.021* (0.002)	I(1)	I(1)
TOP	-2.141 (0.2234)	-5.150* (0.000)	-2.160 (0.220)	-5.120* (0.000)	I(1)	I(1)
HRD	-3.589** (0.020)	-8.150* (0.000)	-3.59** (0.010)	-8.310* (0.000)	I(0)	I(0)
PG	-0.720 (0.811)	-3.587** (0.012)	-0.611 (0.856)	2.789** (0.027)	I(1)	I(1)

Note: The significance of statistics at 1% and 5 % levels are represented by * and** respectively. The values in Parenthesis () are the P-values

Table 4 : F-Statistics for Long-run Relationship

Equations	F-Calculated (P-value)	F-Statistics Critical values at 5% level [^] I(O) ----- I(1)	Result
1. Fy (GDP / PG,TO, UN, HRD)	7.54 (0.013)**	(3.29)----(4.37)	Co-integration
2. Fy (PG /GDP,TO, UN, HRD)	2.14 (0.293)	(3.29)----(4.37)	NO Co-integration
3. Fy (TO/ GDP,PG, UN, HRD)	0.3816 (0.761)	(3.29)----(4.37)	No Co-integration
4. Fy (UN / GDP,PG,TO, HRD)	0.9863 (0.760)	(3.29)----(4.37)	No Co-integration
5. Fy (HRD/ GDP,PG,TO, UN)	0.7828 (0.623)	(3.29)----(4.37)	No Co-integration

** represent significant at and 5% level respectively.

[^] Critical values for the Wald test (F-statistics) are taken from Pesaran *et al.* (2001) table CI(III), case III (unrestricted intercept and no trend).

- In the first step existence of the long run relationship are tested and (-1.78)*** (2.60)* (-0.29) (0.85) (-2.30)** (A2)
- In the second step the long run coefficient are estimated and then the short run adjustment is also estimated in this step. * and *** represents the significance at 1% and 10% respectively.

The results for the testing of long run relationship are given in the table 4. From the given table it is clear that there is only long run relationship among the selected variables which confirm efficient results.

Existence of Long Run Relationship: After the existence of long run relationship the second step is the estimation of the long run parameters and the short run adjustment which are given below

Long-Run Elasticities:

$$LnGDP_t = 1.5 + 0.3 PG_t + 0.06 HRD_t - 0.23 UN_t + 0.74 TOP_t$$

T.Vs (0.55) (1.85)***(0.88) (-1.97)***(0.57) (A1)

The long run results show that the impact of population growth is positive and significant at 10% level of significance, while the impact of unemployment rate is negative and significant at 10%. The impact of TOP and HRD are insignificant. The results of this study contradict with the Afzal (2009). He concluded that population is a real problem. But the result of the current study is in the line with Furuoka (2009) and Adewole (2012) for the economy of Thailand and Nigeria respectively. Both the study used the same Bond Testing approach.

Short-Run Elasticities:

$$\Delta GDP_t = 0.05 - 0.36 \Delta PG_{t-1} + 0.16 \Delta HRD_{t-1} - 0.002 \Delta UN_{t-1} + 0.03 \Delta TOP_{t-1}$$

From short run dynamics it is clear that the value of ECM is negative and less than one i.e. -0.38, which means that any departure in equilibrium will be adjusted in two and a quarter of year. The short estimates of the model shows that population growth has negatively contributed in the short run. The impact of unemployment rate is negative and insignificant. HRD is positive and highly significant in the short run. It is one of the main inheriting problem of most of the developing countries that most of the developing policies enough good in the start while its capability reduced after some time. TOP is positive but insignificant.

It is clear from the above table that the model is clear from basic econometric problems i.e. serial correlation, hetroscedasticity, normality and functional form.

From the figures 1a,b of CUSUM and CUSUMSQ investigating the impact of population growth on economic development clarifies that the estimated model is stable because of the CUSUM and CUSUMSQ statistic sketch is fall within the critical bound values (critical lines) at 5% level.

Table 3: Diagnostic Tests of the Real Exchange Rate Model

Tests	F-Statistic	Probability
1. Serial Correlation	0.268	0.612
2. Hetro-scedasticity	0.308	0.584
3. Normality*	2.647	0.266
4. Functional Form	0.054	0.818

1. Lagrange Multiplier test
2. Regression of residuals on square fitted values
3. Skewness and Kurtosis of the residuals (based on Chi-square test)
4. Ramsey's reset test.

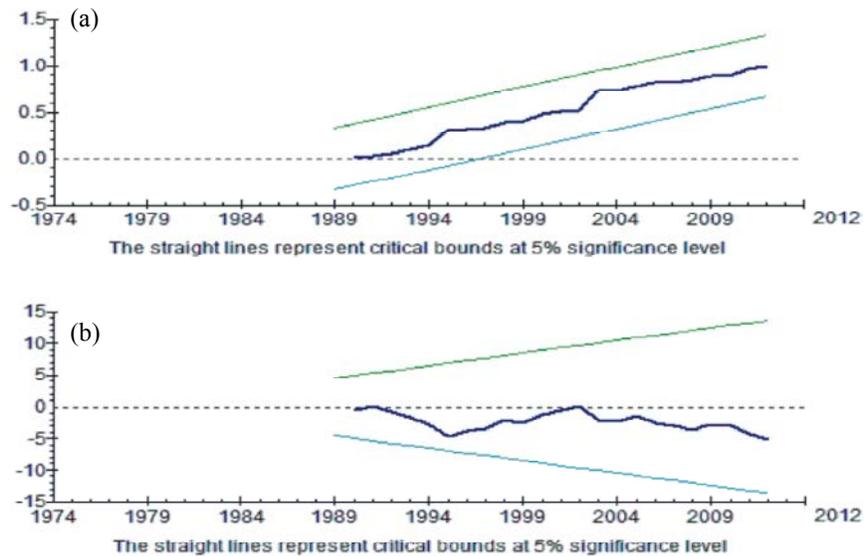


Fig. 1a,b: a) Plot of Cumulative Sum of Squares of Recursive Residuals
 b) Plot of Cumulative Sum of Recursive Residuals

CONCLUSIONS

The prime objective of this paper is to find out the impact of population growth on economic development of Pakistan, but in order to clear and vast the scope of the study this paper have added some important variables which related to population growth and affect economic growth. For this purpose, this paper used thirty four years annual data from 1975 to 2008. Moreover, effect of population on economic growth is still an open question as optimistic as well as pessimistic views are available in the literature. This paper empirically claims that population growth have positive impact on economic growth, As far as Pakistan is concerned, the results of this study contradict with the Afzal (2009) assertions that population growth negatively contribute to economic growth and in favor of the second view that population growth is not a real problem it may help the economic growth with large scale of labor force available and division of labour. Development policy and government efficiency and management are taken into account (proxies are used: expenditure on health and education for development policy and unemployment for government efficiency and management). The purpose of the government efficiency and development expenditure variables is to clarify the impact of population growth on economic development. Because most of the developing countries blamed population growth for their underdevelopment not considered their inherent

problems for it. Unemployment and Human Resource development are very much important for growth and development. It concluded that population growth is not a real problem, the problem of Pakistan is unemployment and development policy that are not effective. So the government of Pakistan should take into account the problem and unemployment and development policy HRD. When once the country has got tremendous growth, reduced unemployment and developed human capital (through HRD) the population growth will be corrected of itself.

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