

An Empirical Study on the Nexus on Poverty, GDP Growth, Dependency Ratio and Employment in Developing Countries

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Abstract

The paper has scrutinized the nexus among poverty, economic growth, employment and dependency ratio in developing countries. The primary intension behind this study is to find out the association between variables such as poverty, economic growth, agricultural and industrial employment and dependency ratio due to the gap in the existing literature. This study fully relies on cross country data and involves forty one countries which have been selected from Asia, Latin America and Sub-Saharan Africa. For this study, OLS method, correlation and econometric tools have been employed. Two models employed in the analysis are goodness of fit because both p-value and F-statistics in the models are less than 5%. The results bring to light the fact that age dependency ratio has had a tremendous impact on poverty and poverty has had a relatively very high impact on the age dependency ratio. Even though Industrial employment has a negative association with poverty incidence, it does not have a significant impact on poverty. The finding that economic growth, poverty and industrial employment significantly affect the age dependency ratio in model two is practicable and consistent with economic theories. Thus stable economic growth with an increase in labour productivity and labour intensive technology is an active remedy for solving this problem.

Key words: Economic growth, poverty incidence, Dependency ratio, Employment, Trickleing down, Asia, Sub-Saharan Africa.

1. INTRODUCTION

Poverty, poor and unstable growth of GDP, unemployment and high age dependency ratio are common issues in the most of the developing countries such as Asia, Africa and Latin America. The people of these countries have been afflicted by poverty and hunger over the long period. Of the about seven billion population on earth, more than 1.3 billion earn less than US \$1 per day. But it is the fact that approximately half of world population are under poverty ridden condition in terms of international poverty line US \$ 2. Over the 200 million people in Africa are trapped in the net of abject poverty. In Sub-Saharan Africa, the incidence of poverty is manifestly tremendous. On the average 45% to 50% of sub-Saharan Africans live below the poverty line in terms of \$1.25 (World bank,1997 ,Osinubi,2005).But in terms of \$2, it is rather high(66.2%) in Sub-Saharan Africa (see table 2) .In west Africa, virtually all countries are classified as low income countries by world bank (Ogwmike,1998). In these countries, human poverty afflicts about half of the population (Ogwmike, 1998).In fact, virtually all- African countries are known to be in poverty and their people experienced very poor living conditions, but vast majority of the people wallow in abject poverty. What is the observable fact is that there may be pockets of rich people in these countries. Out of ten poorest countries in the world in 1995, 8 of them



were in Africa. Many African countries experienced deterioration in their GDP per capita in the 1990s which further has deteriorated the living condition of these people and poverty incidence. Nigeria where total population is high in African region has been bedeviled with unemployment and poverty. Generally, in Africa macroeconomic indicators are so unfavorable which hinder the development of country as well as poverty reduction. For instance, Nigeria official statistics show that economic growth has not always been accompanied by decrease in unemployment and poverty (Osinubi, 2005). In other words, economic growth, poverty, unemployment, balance of payment and budget deficits are complex in these countries. Baker (1997) in his analysis of Caribbean countries has put forwarded the fact that “ the causes of poverty in the Caribbean countries linked to several complex, interrelated factors such as negative and unstable economic growth ,macroeconomic instability ,deficiencies in labour market, low productivity, low wage and decline in the quality of social services”. Thus, solution for poverty issues for all developing countries is to escape from these complex issues using appropriate policy measures and active implementation process. Further, more than one third of world populations living in Asia undergo severe and widespread poverty and hunger. According to the table 1, the fact that growing countries in Asia such as China ,India Pakistan and Bangladesh accounting for 41.1% of total world population have been undergoing severe poverty in the region over the long period . While two third of world’s poor live in Asia, South Asia is a home for most of them (Osinubi, 2005). It is instructive to see obviously that these developing countries are undergoing dehumanizing and persistent poverty for long period. In all these countries such as Asia, Sub- Saharan Africa and Latin America, chronic poverty is being transmitted to next generations because of unstable and poor economic growth, high population growth rate, and lack of education, severe unemployment, low paid wage and refusal of social and political freedom. As a matter of fact, growing body of empirical studies indicate that refusal of participation of social and economic activities as well as ignorance of poor people from political participation highly afflicts the economic growth of the particular country and thereby this circumstances lead to further deterioration of country and severe chronic poverty. Therefore, every county should empower to poor people to take decision and to participate in social and political matters which enhance the living standard of poor and preclude the transmission of poverty to the next generation. Indeed, for making this kind of the positive impact on the economy as well as poor people, visionary and uncorrupted government needs to be formed. In author point of view, without visionary and well- policy structured government, countries never make significant contribution on the whole economy. In General, virtually all developing countries are characterized the high population and high dependency ratio which is one of the main causes for poverty, hunger and unemployment. Therefore, many economists and socialists put forwarded their emphasis on the control of population growth in wake of 1950s and thereby decreasing the dependency ratio. Indeed, age dependency ratio is high where severity of poverty and unemployment is high where as age dependency ratio afflicts the poverty and economic growth. Table 1 shows the top ten countries having highest population in the world of which India and China have almost 37% of total population in the world.

Tab. 1 - Top ten countries with largest total population in 2011. Source: World Bank (www.data-worldbank/indicator/SP.POP.TOTAL/countries).

Countries	Population	% of world population
China	1,344,130,000	19.0%
India	1,241,491,960	17.5%
USA	311,591,917	4.4%
Indonesia	242,325,638	3.4%
Brazil	196,655,014	2.8%
Pakistan	176,745,364	2.5%
Nigeria	162,470,737	2.3%
Bangladesh	150,493,658	2.1%
Russia	141,930,000	2.0%
Japan	127,817,277	1.8%

Table 2 clearly elucidates the poverty status of various regions in accordance with criteria of \$1.25 and \$2 per day. As per table 2, only 0.5% people live with income of 1.25\$ per day in the Europe and central Asia. In East Asia, it was 14.3%. What can be understood from the table 2 is that 36% of people in South Asia live below poverty in terms of 1.25\$ while 47.5% people of Sub-Saharan Africa live in poverty in the region. Taking the 2\$ as criterion for poverty line (poverty head count index), 70.9 % of people in South Asia inhabit below poverty while 66.2% of people of Sub-Saharan Africa inhabit below poverty. On the contrary, people of East and Pacific living below poverty have been increased from 14.3 % (in terms of 1.25\$) to 33.2 % (in terms of 2\$). 1.4 billion people of the developing countries lived below \$1.25 a day in 2005 price; 25 year earlier there were 1.9 billion poor. Even though some region has slightly shown decreasing poverty, progress is uneven across region (Chen, Ravallion, 2010). It is the fact that regions such as Asia, Sub-Saharan and Latin America and Caribbean and Asia and Pacific account for vast majority of poor in the world. Even though there is difference between terms poverty and hunger, poverty is a principal cause of hunger. Generally, world hunger refers to scarcity of food in a country. In round numbers, there are 7 billion people in the world (7.065 billion) in which 13.1% or almost 1 in 7 people are hunger which adversely afflict the growth and development of country.

Tab. 2 - Poverty head count ratio at \$1.25 and \$2 a day (PPP) in 2008. Source: World Bank (www.worldbank.org).

Regions	% Population (1.25\$)	% Population (2\$)
East Asia and Pacific	14.3%	33.2%
Europe and central Asia	0.5%	2.2%
Latin America and Caribbean	6.5%	12.4%
Middle East and North Africa	2.7%	13.4%
South Asia	36.0%	70.9%
Sub-Saharan Africa	47.5%	66.2%

2. LITERATURE REVIEW

There would generally be nexus among the economic growth, poverty, employment and high population or high age dependency ratio. It is noted the fact that poverty, age dependency ratio and unemployment are very high whereas economic growth is very low and unstable in all most of all less developing countries such as Asia, Sub-Saharan Africa and Latin America except some countries such as Singapore South Korea, Taiwan, Hong Kong. Developed countries such as America Europe, Japan and Australia are characterized by high and stable economic growth and employment with low dependency ratio and thereby people are enjoying fruitful of economic growth and development. As a matter of fact, due to having low level population and population growth rate, developed countries have had low level dependency ratio while developing countries have had high dependency ratio due to the vast population and high population growth rate. What is the important fact is that in addition to economic growth and unemployment, dependency ratio due to the high population of these countries also highly affects the poverty. On the contrary, poverty, unemployment and poor and unstable economic growth pay the way to the increase of dependency ratio .The age dependency ratio (∇% of working age population) has been considerably decreasing in China as compared to other developing countries . The age dependency ratio of China is 77.3% in 1960 and 38.2% in 2010 where as that of India is 77.6% in 1960 and 55.06% in 2010. Further, age dependency ratio of Pakistan, Sri Lanka, Bolivia and Kenya for 1960 is 80.9%, 86.2%, 84.6, 100.4% and 65.7%, 49.3%, 68.7% 82.8% in 2010 respectively. Economic growth of China is stable and high compared to other Asian and African countries. What is the noteworthy is that at the outset of China's reform period, the country had higher poverty rate and dependency ratio than Africa as a whole. Now, China has escaped from poverty (Ravallion, 2009) but African countries remain severe abject poverty.

The early theory of development emphasizes that economic growth automatically trickles down to the weaker section of the society or towards poor people. In 1950s, most of the economists believed that economic growth benefits nearly all citizens of a country based on trickle down mechanism, even if not equally, and therefore reduces poverty .Due to automatic trickling down the benefits of growth towards poor people, it was expected to be gradual improvement of living standard of poor. But end of 60s, trickling down the benefits automatically towards poor people did not appear in developing countries. Thus, economists re-considered about automatic trickling down the benefits of growth and emphasized the re-distribution of growth's benefits in which government can play crucial role. Economic growth is important (pre-condition for development), but alone it does not necessarily reduce poverty. The poor people can also obtain fruits full of economic growth when benefits of economic growth are distributed by proper institution or state. In other words, Income generated by growth should be widely distributed throughout the population. Where poverty has been reduced successfully and sustainably, governments used policy interventions to facilitate employment centered structural transformations of their economies. Most of the literatures with regard to growth, inequality and poverty have been contradictory. Accordingly, some economists emphasize that growth has significant and positive impact on the poverty reduction and inequality where as some observers argue that economic growth tends to increase income (and asset) inequality. As a matter of fact, these higher levels of inequality ensure that economic growth benefits the rich rather than the poor. Adelman and Morris (1973) argued that "Development is accompanied by an absolute as well as a rela-

tive decline in the average income of the very poor. The frightening implication (of this) is that hundreds of millions of desperately poor people have been hurt rather than helped by economic development. These arguments on the relationship between growth and poverty were heavily influenced by the Kuznets hypothesis (1955). This hypothesis claims that growth and inequality are related in an inverted U-shaped curve: in the early stages of economic development, income distribution tends to worsen and does not improve until countries reach middle-income status. The empirical findings of studies (Ravallion, 1995; Deininger and Squire, 1996, 1998; Schultz, 1998; and Bruno, Ravallion and Squire, 1988) tend to reject the Kuznets hypothesis. In the words of Ravallion: "The rejection of the inverted U hypothesis (of the Kuznets curve) could not be more convincing". However, the most current thinking is that economic growth does not have much of an impact on inequality because income distributions generally do not change much overtime. According to Deininger and Squire (1996), gross domestic product (GDP) per capita increased by 26 percent in the developing world between 1985 and 1995, while Gini coefficients in the world changed by only 0.28 percentage points per year over the same period. Since income inequality tends to remain stable over time, economic growth can be expected to reduce poverty at least to some extent. Generally, government should intervene in bringing about positive distributional effects towards poor people where income inequality is high. Ravallion (2010) in his study of 90 developing countries contended that poor countries have less internal capacity for redistribution in favor of their poorest citizens. The less capacity for redistribution of economic growth's benefits is a one of the cause for further increase of poverty in developing countries. Ahluwalia, Carter & Chennery (1979) have also mentioned that growth benefits of developing countries have reached the poor to very limited degree for last 20 years. Datt and Ravalion (2011) have examined the growth's benefits on poverty after major economic reforms of India. *They mention "There is no robust evidence that responsiveness of poverty to growth has decreased or increased since transformation begins, although there are signs of rising inequality. Urban economic growth in the period after reforms has brought significant gains to the rural poor as well as urban poor. While the rural poor have benefited more from urban economic growth in the post-reform economy, it can be expected that the reverse also holds: India's rural poor will be more vulnerable in the future to urban-based economic shock"*. In addition to unstable and poor economic growth along with unemployment and high population, skewed distribution of economic growth's benefits towards rich people is severe and common issue in all developing countries.

Exactly how much growth actually reduces poverty depends on at least two factors. The first is the size of rate of economic growth itself. Using an international poverty line of \$1 per person per day, an econometric study by Squire (1993) regressed the rate of poverty reduction in a country against its rate of economic growth. His results show that a one percentage point increase in the growth rate reduced the poverty headcount (\$1 per person per day) by 0.24percentage points. A similar econometric study was done by Bruno, Ravallion and Squire (1998). For 20 developing countries over the period 1984 to 1993, these three authors regressed the rate of change in the proportion of the population living on less than\$1 per person per day against the rate of growth (change in survey mean income) and obtained a statistically significant regression coefficient of -2.12. This means that a 10 percentage point increase in growth (as measured by survey mean income) can be expected to produce a 21.2 percent decrease in the proportion of people living in poverty (\$1 per person per day). The second factor affecting how much economic growth re-

duces poverty is the pattern of growth and the extent income distribution. In a straightforward statistical sense, economic growth can be expected to reduce poverty more if income distribution occurs, than if it does not. This expectation is confirmed by the previously cited study of Bruno, Ravallion and Squire (1998). For the same 20 developing countries, these authors regressed the rate of change in poverty on both the change in growth (change in the survey mean) and the change in inequality (as measured by the Gini coefficient). They obtained statistically significant coefficients of -2.28 for the growth variable and 3.86 for the inequality variable. In other words, even small changes in the overall distribution of income can lead to sizeable changes in the incidence of poverty. Thus, Chennery, et al(1974) in the study of redistribution of growth emphasized the fact that economic growth should be redistributed. What is important fact is that if the pattern of growth is more labor intensive, economic growth undoubtedly leads to decrease in poverty as well as the improvement in the income distribution.

As already mentioned, growth is necessary but not sufficient to alleviate poverty in a country. As forgoing discussion, pattern of growth is important which could be more effective for eradicating poverty. Some studies have explicitly mentioned the importance of labor intensive growth (World bank 1990., Squire1993., McKay1997., Ravallion, 1995). However, none of these studies explicitly examine the dependency ratio nexus in the linkage between economic growth poverty and employment and also none of studies carried out so far to analyze the poverty nexus among agricultural and industrial employment, dependency ratio and economic growth .The primary intention behind the present paper is to make a contribution towards filling the gap in the literature. And in doing so, the paper also make an attempt to identify possible elements of pro-poor growth in terms of output growth coupled with growth of employment and rising productivity and also controlling population growth rate.

2.1 Linkage among growth, employment, dependency ratio and poverty

Economic growth is regarded as preponderant and driving force of conquering unemployment and poverty in general. However, poverty of sub-Saharan Africa is highly characterized by unemployment even though there are other causing factors (Obadan, 1997). Generally, one can explicitly understand that conceptual linkage among the economic growth employment, population and poverty. Average dependency ratio due to the high population is high in developing countries in which labor productivity would be low because of inadequate nutritional food, health and education. General theory tells us that lower the labor productivity lower the economic growth and higher the unemployment and poverty. On the contrary, high dependency ratio in a family or in case of the developing countries leads to lower productivity of such labor force. It is the fact that there is positive relationship between dependency ratio and poverty. As such, there is inverse relationship between poverty and employment .Further, as many empirical studies indicated, there would be inverse relationship between poverty and economic growth. As higher rate of economic growth pay the way the sustained and stable increase in productive capacity, employment opportunities with rising productivity are generated. In fact, this enables country to absorb more employees in the production and allied activities and thereby decreasing under and unemployment. In this process poor could definitely be able to achieve higher productivity and increase their income in their existing occupations or to obtain new jobs with better remuneration than before. As a matter of fact, employees getting better remuneration than

before would make possible to spent more income on nutritional food, education and health care of their children which will enhance the productivity of workforce and also decrease the dependency ratio via education and awareness. Moreover, the effective family planning and reproductive health program can enhance women's human capital and productivity and the gains in productivity due to a program-induced decrease in fertility and slowing of population growth appear to have promoted development (Schults, 2009). However, this study obviously highlights the fact that there is association among poverty, economic growth, and employment and dependency ratio.

3. OBJECTIVE OF STUDY METHODOLOGY

The main aim of the study is to find out the association between variables such as poverty, economic growth, agricultural and industrial employment and dependency ratio due to the gap in the existing literature. Furthermore, second aim of study is to identify the size and impact of economic growth, employment and age dependency ratio **on poverty in model one** whereas to know the size and impact of economic growth, employment and poverty **on Age dependency ratio in model two**. This study fully relies on cross country data and involves forty one countries such as Argentina, Bahamas, Bangladesh, Bolivia, Botswana, Brazil, Burkina Faso, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Ethiopia, Gambia, Ghana, Guatemala, Honduras, India, Indonesia, Jamaica, Kenya, Madagascar, Mali, Mexico, Nigeria, Nepal, Pakistan, Panama, Paraguay, Peru, Rwanda, Senegal, Sierra Leone, Sri Lanka, Tanzania, Thailand, Uganda, Uruguay, Venezuela, Zambia and Zimbabwe,

The data have been gathered from various reports such as human development reports, world income inequality data base, World Bank world development indicators, World Bank world development reports and World Bank African development indicators. The multiple regression models were employed to analyze cross country data. For the problems of multicollinearity, serial correlation and heteroscedasticity to be detected, econometric techniques like Breusch-Godfray LM test, residual normality test and heteroscedasticity test were carried out. In this study, there are several variables such as poverty, economic growth, industrial employment, agricultural employment and dependency ratio. The entire analysis has been carried out with the use of E-views software.

4. MODEL SPECIFICATIONS

As already mentioned above, this study focuses on analysis of relationship among the poverty, growth, employment and dependency ratio. For the analysis of this study to be carried out, cross country data of forty one developing countries was used. The researcher indicates the fact that poverty has negative and significant relationship with economic growth and employment whereas it has positive and significant association with dependency ratio. Therefore, author uses the following model based on research gap.

$HI=f(\text{Economic Growth, agricultural employment, industrial employment, dependency ratio})$

On the basis of this function, multiple regression models can be written as follows

$$HI = \beta_1 + \beta_2 \text{GRO} + \beta_3 \text{EMPagri} + \beta_4 \text{EMPind} + \beta_5 \text{AGEDEP} + u_1 \tag{i}$$

The multiple regression models one could be rearranged in log form as follows.

$$\text{Log HI} = \beta_1 + \beta_2 \text{LogGRO} + \beta_3 \text{Log EMPagri} + \beta_4 \text{Log EMPind} + \beta_5 \text{Log AGEDEP} + u_1 \quad (\text{ii})$$

In this equation, HI refers to incidence of poverty. The variables such as GRO, EMPagri, EMPind, AGEDEP refer to economic growth, agricultural employment, industrial employment, dependency ratio respectively. The u_1 is error term. The dependency ratio is proxy for population growth in which it is expected that there is positive and significant association between poverty and dependency ratio. The economic growth has negative association but not significant with poverty whereas agricultural and industrial employment are expected to be negatively associated with poverty.

The high population growth and unemployment and consequent high dependency ratio has been a crucial and severe issue in all most all developing countries for long period. Thus, population control is obviously needed to solve the various issues such as unemployment, depletion of natural resources, high density of urban population and poverty, etc. In fact, the dependency ratio affects the poverty whereas variables such as poverty, slow economic growth and unemployment also affect the dependency ratio. In other words, these factors pay the way to the increase of dependency ratio which is real experience of developing countries. Thus, author strives to find out how and how far variables such as poverty, employment and economic growth can have impact on dependency ratio. For this purpose, following functional form is performed

$$\text{AGEdep} = f(\text{poverty, agricultural employment, industrial employment, economic growth})$$

On the basis of this function, multiple regression models two could be written as follows

$$\text{AGEdep} = \gamma_1 + \gamma_2 \text{POV} + \gamma_3 \text{EMPagri} + \gamma_4 \text{EMPind} + \gamma_5 \text{GRO} + u_2 \quad (\text{iii})$$

The equation two could be rearranged in log form for our purpose of study as follows.

$$\text{Log AGEdep} = \gamma_1 + \gamma_2 \text{LogPOV} + \gamma_3 \text{LogEMPagri} + \gamma_4 \text{LogEMPind} + \gamma_5 \text{LogGRO} + u_2 \quad (\text{iv})$$

AGEdep is a dependent variable. The rest of other variables are independent in equation (iii and iv). The u_2 is stochastic disturbance in equation.

It is expected to be positive and significant impact of poverty on dependency ratio while economic growth, industrial and agricultural employment would have negative association with dependency ratio.

5. EMPIRICAL RESULTS AND DISCUSSION

As forgoing discussion, Cross county data have been employed for the model estimation using E-views. Accordingly, following equation was derived and the details of entire outcome are shown in the table 3. The value of R^2 of 0.60 means that the virtually 60% of variation in poverty incidence of selected 41 developing countries is explained jointly by variables such as economic growth, employment(agri), employment(ind) and age dependent ratio. The rest of the 40% variation in poverty incidence can be explained by residuals or other variables. R^2 of 0.60 indicates the statistical fitness of model. The p-value of F-statistic of 0.000007 also confirms the fact that this model is more appropriate to further analysis and forecasting.

$$\begin{aligned} \ln HI = & -38.83463 - 0.429969 \ln GRO - 0.311882 \ln EMPind + 0.155229 \ln EMPagri + \\ & 78.41696 \ln AGEDEP \\ R^2 = & 0.601186 \end{aligned}$$

In accordance with regression result of table 3, as already predicted, economic growth and EMPind have negative sign indicating negative association among HI, GRO and EMPind. As expected, agricultural employment does not have negative sign. But, as explicated in the economic theory and practice, AGEDEP was positively associated with HI. As per economic theory, economic growth has negative relationship with poverty incidence. When EMPind, EMPagri and AGEDEP remain constant, a 1% rise in economic growth decreases HI by 0.42% and its P-value is 0.04 which indicates the statistical significance of growth variable. What is the observable fact is that even though economic growth is statistically significant, its impact on poverty is very margin. This is due to poor and unstable economic growth, mismanagement, low productivity and real wage and vast income inequality of these countries. Some Caribbean countries (Antigua, Barbuda and Barbados) that have sustained growth have decreasing unemployment and thereby reducing poverty (Baker, 1997). But, Caribbean countries having low and negative growth have had experience of increased poverty (Osinubi, 2005). Meier (1989) in his study clearly proved that there is strong inverse correlation between economic growth and poverty. There is some controversial arguments and conclusion about relationship poverty and growth. Even though the proposition that economic growth has negative strong association with poverty is not perfect, there is general consensus that stable economic growth in the long run will alleviate most absolute poverty (World Bank, 2001., Obadan, 1997). When variables such as GRO, EMPagri and AGEDEP remain constant, a 1% increase in EMPind decreases HI by 0.3% and vice versa. Even though there is negative sign of EMPind, it is insignificant because its p-value of 0.66 is more than 5 % (0.05). As already stated, economic growth along with increase in productivity of labourer will significantly decrease the poverty. In Indonesia, South Korea and Malaysia, the reduction of unemployment along with increase in productivity leads to significant reduction of poverty (World Bank, 1990). What is noted the fact that as expected, EMPagri does not have negative relationship with HI and its P-value of 0.2 indicates that this variable is insignificant. Around 80% of people in these countries inhabit in rural areas of which most of them are below international poverty line. For instance, in Asia 36% people are below severe poverty and in Sub-Saharan Africa it is 47.5% in terms of \$1.25. If taking \$2 as a criterion for poverty, the situation further deteriorates. Unfavorable climate such as lack of rain, drought, earth quake, tsunami etc adversely affect the agriculture while price of agricultural products are more fluctuated. In addition to this, intermediates are getting more benefits than famers. The civil internal conflict, youth unrest, corrupted government, lack of political freedom for poor very and low wage both simultaneously and severely afflicts the rural agriculture and thereby increasing rural poverty which may be cause for positive sign for EMPagri. As articulated in the economic theory, rapid population growth and consequent high dependency ratio is an impediment for the economic growth and development of the country and thereby increasing trend of poverty. Therefore many economists and socialists contended that high population growth and consequent increasing dependency ratio should be controlled to decrease the poverty and hunger of developing countries in particular. In compliance with the regression result of table 3, as predicted earlier, the relationship between poverty and age dependent ratio is positive and

highly significant indicating the fact that 1% increase in dependency ratio leads to increases in poverty incidence by 78%. Its P-value is 0.0014 which claim the significance of AGEdep. What is observable fact is that the impact of age dependency ratio on poverty is highly big .The conclusion that age dependency ratio has very big impact on poverty is consistent with practice and existing economic theory.

Tab. 3 - Ordinary Least Square Results. Source: author’s own.

Variables	coefficient	St.Error	t-statistic	prob
GRO	-0.429969	1.065715	-0.403456	0.0484
EMPind	-0.311882	0.713646	0.437026	0.6651
EMPagri	0.155229	0.120160	1.291849	0.2060
AGEDEP	78.41696	22.28097	3.519458	0.0014
C	-38.83463	22.20999	-1.748521	0.0903
R-squared	0.601186	Mean dep.var	27.97500	
Ad-R-squared	0.549736	S.D.dep.var	19.87477	
S.Eof regression	13.33646	Akaike.info	8.147127	
Sum of squ.resid	5513.692	Schwarzriter	8.367060	
Log likelihood	-141.6483	F statistic	11.68261	
Durbin-Watson	1.997517	Prob(F-statis)	0.000007	

Generally, while fitting the regression equation, mullicollinearity problem may arise. The following correlation matrix clearly shows the fact that this model does not have multicollinearity problem.

Tab. 4 - Correlation Matrix. Source: author’s own.

	GROW	EMPind	EMPagri	AGEDEP
GRO	1.000000			
EMPind	0.210010	1.000000		
EMPagri	-0.259840	-0.741016	1.000000	
AGEDEP	-0.383621	-0.683360	0.703572	1.000000

In conformity of table 4, one can understand that there is no multicoolinearty problem because of no-high correlation among explanatory variables. Observed R-square is 12.0060 and corresponding p-value is 0.150935 which indicates that there is no heteroscedasticity problem. Further, Durbin-Watson test also confirms the same conclusion that there is no heteroscedasticity. Breusch- Godfray -LM test was carried out to find out whether or not this model has serial correlation of residuals. According to this test, observed R-square is 0.674599 and corresponding p-value is 0.7113695 which indicates fact that model does not have serial correlation. Further, in the normality test, Jarque Bera statistic was performed Jarque Bera statistic is 0.399857 and corresponding p-value is 0.8818789.Thus, residual in this model has normal distribution because its p-value is more than 5 %(0.05).

In the first model, author has clearly articulated the fact that economic growth has had negative sign and is also consistent with most of the empirical as well as economic theories where as age dependency ratio has had positive and significant impact on the poverty which is also consistent with empirical as well as economic and social theories. In case of industrial employment, there is negative sign as expected but not significant. In second model, dependency ratio as a proxy for population growth was taken as a dependent variable because dependency ratio as a proxy for population growth is a crucial factor in determining several things in both demand and supply side while many social as well as economic factors influence on dependency ratio. Therefore, dependency ratio was taken as dependent variable. In the model 2 (table 5), author has proved the fact that there is positive association and significant impact of poverty on dependency ratio and statistically significant and negative association of industrial employment and economic growth on dependent ratio. Regression outcome is summarized in the table 5.

$$LnAGEDEP = -0.481260 + 2.1234LnPOV - 0.0435LnGRO - 0.1084LnEMPind + 0.0214LnEMPagri$$

Cross county data have been transformed in to log form and employed for the second model estimation using E-views. The details of entire outcome are shown in the table 5. The value of R² of 0.71 means that the virtually 71% of variation in age dependency ratio of selected 41 developing countries is explained jointly by variables such as poverty, economic growth, employment(agr i), employment(ind). The rest of the 29% variation in age dependency ratio can be explained by residuals or other variables. R² of 0.71 indicates the statistical fitness of model. The p value of F-statistic (0.000000) also confirms the fact that this model is more appropriate to further analysis and forecasting. In accordance with regression result of table 5, as already predicted, poverty incidence has had positive association with dependency ratio. 1% decrease in poverty incidence leads to 2.12% decrease in age dependency ratio and vice versa. Its p-value of 0.0001 indicates the statistical significant. What is noteworthy is that the impact of poverty on dependency ratio is big and significant. In general, as poverty increases in a family, dependency ratio will also rise. In this backdrop if there is high unemployment in a country, dependency ratio further increase because (1) poverty is one of the causes for increase in family members (2) On account of lack of education due to poverty and consequent lack of awareness about social economic life, people are induced to have more children (3) generally, very poor people who are day wage laborers tend to have happiness with unprotected intercourse with their partner because of lack of knowledge about controlling number of children (4) wage earners consume more liker and low quality liker so as to decrease their tiredness which may be reason for increase of the children.

Tab.5 - Ordinary Least Square Results. Source: author's own.

Variables	coefficient	St.Error	t-statistic	prob
LogEMPagri	0.021410	0.021322	1.004122	0.3231
LogEMOind	-0.108478	0.043578	-2.489281	0.0184
LogGRO	-0.043574	0.023036	-1.891589	0.0479
LogPOV	2.123410	0.236570	8.975821	0.0001
C	-0.481260	0.174036	-2.765285	0.0095
R-squared	0.712063	Mean dep.var	-0.325802 0.223300 -1.156005 0.936072 19.165620 0.000000	
Ad-R-squared	0.674910	S.D.dep.var		
S.E.of regression	0.127318	Akaike.info		
Sum of squ.resid	0.502509	Schwarzriter		
Log likelihood	25.80809	F statistic		
Durbin-Watson	2.00840	Prob(F-statis)		

It is the observable fact that this high age dependency ratio again induces people to go down further poverty trap. It is noted that this is vicious circle in poor family system. In this backdrop, poverty can be transmitted to next generation. What is the solution to decrease this severity is to provide better basic education and awareness. Thus, this empirical study is consistent with practice and social theory. The coefficient of economic growth is -0.04 . Thus, 1% increase in economic growth leads to mere 0.04% decline in dependency ratio. Even though economic growth is statistically significant, its impact on dependency ratio is very margin. According to the general economic theory, as stable economic growth occurs, productive capacity will also increase and consequently growth's benefits automatically trickle down. Moreover, as this growth is associated with more labor intensive technology, employment opportunities will definitely increase which lead to decrease in dependency ratio. As expected, industrial employment has negative sign. As industrial employment increases by 1%, dependency ratio decreases by 0.1% and vice versa. The industrial employment is statistically significant because its p-value is 0.01 which is less than 5%. The conclusion that INDemp has had impact and negative sign on dependency ratio is practicable and is also consistent with economic theory. The increase in employment generally leads to decrease in dependency ratio in family or in a country. What is the important fact is that as predicted, EMPagri does not have significant and negative sign. The coefficient of EMPagri is 0.02 and its p-value is 0.3 indicating that EMPagri is not significant. Virtually 80% people in Asia, Latin America and Sub-Saharan Africa rely on agriculture and allied services. Increase in opportunity for stable employment from agriculture is questionable. The most of them depend upon for their livelihood in small agricultural land. The rural agriculture is unable to absorb surplus laborers. Moreover, agriculture often is affected by various factors such as flood, drought, lack of rain and etc. Therefore, negative sign and significant impact in regard to agricultural employment does not occur in this analysis.

Tab. 6 - Correlation Matrix. Source: author's own.

	LogEMPagri	LogEMPind	Log GRO	Log POV
LogEMPagri	1.000000			
LogEMPind	-0.447739	1.000000		
LogGROW	-0.003479	0.160644	1.000000	
LogPOV	0.420428	-0.404334	-0.232623	1.000000

In consonance with table 6, one can understand that there is no multicollinearity problem because of no-any high correlation among explanatory variables. Observed R-square is 10.9656 and corresponding p-value is 0.203655 which indicates the fact that there is no heteroscedasticity problem. Further, Durbin-Watson test also confirms the same conclusion that there is no heteroscedasticity. Breusch- Godfray -LM test was carried out to find out whether or not this model has serial correlation of residuals. According to this test observed R-square is 2.713349 and corresponding p-value is 0.257516 which indicates fact that model does not have serial correlation. Further, in the normality test, Jarque Bera statistic was performed. Jarque Bera statistic is 1.560731 and corresponding p-value is 0.458237. Thus, residual in this model has had normal distribution because its p-value is more than 5 % (0.05).

6 CONCLUSION AND RECOMMENDATIONS

The paper has scrutinized the nexus among poverty, economic growth, employment and dependency ratio in the developing countries such as Asia, Africa and Latin America. In general, poverty, poor and unstable growth of GDP, unemployment and high age dependency ratio are common issues in the most of the developing countries and thereby people of these countries have been afflicted by poverty and hunger over the long period. This empirical result brings to light the fact that age dependency ratio significantly affects the poverty and has positive association with poverty. What is observable fact is that the impact of age dependency ratio on poverty is highly tremendous. Similarly, poverty as an independent variable has had significant and positive association with age dependency ratio. The impact of poverty on age dependency ratio is also relatively very high. The conclusions that age dependency ratio has had tremendous impact on poverty and poverty has had relatively very high impact on age dependency ratio are consistent with practice and existing economic theory. Policy makers and competent authority should concentrate their attention on the population control and generating active population in a country. Moreover, this study has proved that economic growth has negative and significant association with poverty. Even though there is negative sign of EMPind, it is insignificant because its p-value of 0.66 is more than 5 %. Labor intensive technology with increase of productivity will significantly decrease the net of the abject poverty. In fact, in these countries where around 70% to 80% population lives in rural areas should give great attention on cottage, micro and small and medium enterprises' development with the active private public participation which will significantly increase the employment opportunity with increases of productivity. Because of being various flaws in the agriculture, it does not have expected sign and significant impact on poverty.

Author regressed dependency ratio against poverty, growth and employment in the second model. This study of model two brings to light the fact that poverty is statistically significant to influence on dependency ratio. The poverty as an independent variable has had significant and positive association with age dependency ratio. The impact of poverty on age dependency ratio is also relatively very high. In general, as poverty increases in a family dependency ratio also will rise. It is the observable fact that this high age dependency ratio again induces people to go down further poverty trap. It is noted that this is vicious circle in poor family system. In this backdrop, poverty can be transmitted to next generation. The providing better basic education, health and awareness are active remedies for this issues and thereby reducing population growth and dependency ratio. The economic growth's p-value of -0.04 indicates that economic growth is statistically significant and has negative association with dependency ratio. Further, as this growth is associated with more labour intensive technology, employment opportunities will definitely increase which lead to decrease in dependency ratio. Thus stable economic growth with increase in labour productivity and labour intensive technology is an active remedy for solving this problem. The industrial employment is statistically significant because its p-value is 0.01 which is less than 5%. Accordingly, the finding that employment significantly and negatively affects the dependency ratio is practicable and is also consistent with economic and social theories. Countries which have more employment opportunities in industrial sector have had less dependency ratio in comparison with agricultural countries. Therefore, as indicated, these countries should give more priorities for the development of cottage, micro, small and medium industrial development. Accordingly, rural people where poverty is severe and widespread can acquire more benefit than before.

References

1. Adelman, N.I., & Morris, C.T. (1973). *Economic growth and Social Equality in Developing Countries*. Stanford: Stanford University Press.
2. Ahluwalia, M.S., Carter, N., & Chennery, H. (1979). Growth and Poverty in Developing Countries. *Journal of Development Economics*, 6(3), 299-341. [http://dx.doi.org/10.1016/0304-3878\(79\)90020-8](http://dx.doi.org/10.1016/0304-3878(79)90020-8)
3. Baker, J.L. (1997). *Poverty reduction and Human development in the Caribbean: A Cross-country study*. World Bank discussion paper, no.366.
4. Bruno, M., Ravallion, M., & Squire, L. (1998). Equity and growth in Developing countries: Old and new perspectives on the policy issues. In Tanzi, V., Chu, K. (eds.) *Income Distribution and High-quality growth*. Cambridge, MA: MIT Press.
5. Chen, S., & Ravallion, M. (2010). The Developing World Is Poorer Than We Thought, but No Less Successful in the Fight Against Poverty. *Quarterly Journal of Economics*, 125(4), 1577-1625. <http://dx.doi.org/10.1162/qjec.2010.125.4.1577>
6. Chen, S., & Ravallion, M. (2001). How did the World's poorest fare in the 1990s? *Review of Income and Wealth*, 47(3), 283-300. <http://dx.doi.org/10.1111/1475-4991.000018>
7. Chennery, H., Aluwalia, M.S., Bell, C.L.G., Duloy, J.H., & Jolly, R. (1974). *Redistribution with Growth*. New York: Oxford University Press.

8. Datt, G., & Ravallion, R. (2011). Has India's economic growth become more poor in the wake of economic reforms. *World Bank Economic Review*, 25(2), 157-189. <http://dx.doi.org/10.1093/wber/lhr002>
9. Deininger, K., & Squire, L. (1996). Measuring Income inequality: A new data base. *World Bank Economic Review*, 10(3), 565-591. <http://dx.doi.org/10.1093/wber/10.3.565>
10. Deininger, R.K., & Squire, L. (1998). New Ways of Looking at Old issues: Inequality and Growth. *Journal of Development Economics*, 57(2), 259-287. [http://dx.doi.org/10.1016/S0304-3878\(98\)00099-6](http://dx.doi.org/10.1016/S0304-3878(98)00099-6)
11. Klasen, S., & Nestmann, T. (2006). Population, Population Density and Technological Change. *Journal of Population Economics*, 19(3), 611-626. <http://dx.doi.org/10.1007/S00148-005-0031-1>
12. Kuznets, S. (1955). Economic growth and inequality. *American Economic Review*, 45(1), 1-28.
13. McKay, A. (1997). Poverty Reduction through Economic Growth: Some Issues, *Journal of International Development*, 9(4), 665-678. [http://dx.doi.org/10.1002/\(SICI\)1099-1328\(199706\)9:4<665::AID-JID475>3.0.CO;2-P](http://dx.doi.org/10.1002/(SICI)1099-1328(199706)9:4<665::AID-JID475>3.0.CO;2-P)
14. Meier, G.M. (1989) *Leading Issues in Economic Development*. Oxford, New York.
15. Obadan, M.I. (1997). Analytical Frame work for Poverty reduction: Issues of economic growth versus strategies: In Poverty Alleviation in Nigeria, Annual conference of Nigerian Economic Society.
16. Ogwumike, F.O. (1998). *Poverty Alleviation Strategies in Nigeria*. In Measuring and Monitoring Poverty in Nigeria, Proceeding of the seventh Annual conference of Zonal Research Unites of Central Bank of Nigeria.
17. Osinubi, T.S. (2005). Macro econometric Analysis of Growth Unemployment and Poverty in Nigeria. *Pakistan Economic and Social Review*, 43(2), 249-269.
18. Ravallion, M. (2001). Growth Inequality and Poverty: Looking Beyond Average. *World Development*, 29(11), 1803-1815. [http://dx.doi.org/10.1016/S0305-750X\(01\)00072-9](http://dx.doi.org/10.1016/S0305-750X(01)00072-9)
19. Ravallion, M. (1995). Growth and poverty: Evidence for Developing Countries in the 1980s. *Economic Letters*, 48(3/4), 411-417. [http://dx.doi.org/10.1016/0165-1765\(94\)00620-H](http://dx.doi.org/10.1016/0165-1765(94)00620-H)
20. Ravallion, M. (2010). Do poor countries have less capacity for redistribution? *Journal of Globalizations and development*, 1(2), 1-29. <http://dx.doi.org/10.2202/1948-1837.1105>
21. Ravallion, M. (2009). Are there lessons for Africa from China's success against poverty. *World development*, 37(2), 303-313. <http://dx.doi.org/10.1016/J.worlddev.2008.06.00>
22. Squire, L. (1993). Fighting Poverty. *American Economic Review papers and Proceedings*, 83(2), 377-382.
23. Schults, T. (1998). Inequality in the income distribution of personal income in the world: How it is changing and why? *Journal of Population Economics*, 11(3), 307-344. <http://dx.doi.org/10.1007/s001480050072>
24. Schults, T. (2009). *The Gender and General consensus of the Demographic Transition and Population Policy: An Assessment of the Micro and Macro Linkage*. Working paper no. 71, Yale University.
25. World Bank (2001). *World Bank report: Poverty*. New York: Oxford University Press.
26. World Bank (1997). *World development report: The state in the changing world*. New York: Oxford University Press.

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