

Research Paper

The Role of Education and Health in Poverty Alleviation

A Cross Country Analysis

ABSTRACT

This research is an attempt to explore; does the overall education and health situation of a country have a considerable impact on poverty magnitude? It also tries to find out the level of efficiency of selected countries to utilise education and health expenditures. This study uses data of 40 developing countries for the period of 1999-2007 and Data Envelopment Analysis (DEA) for empirical estimation. The study concludes three key findings. First, in contrast to trickle-down theory, achieving decent or high income growth rates do not ensure poverty reduction at similar pace. Second, improvements in educational and health outcomes are strongly and negatively associated with poverty incidence. However, educational improvements appear to be more strongly correlated with decline in poverty headcounts as compared to health improvements. Third, efficient use of public expenditures on education and health not only results in improved educational and health outcomes, but it also permits a reduction in poverty and income inequality.

Keywords: *Education, Health, Income, Income Distribution, Poverty Alleviation, Data Envelopment Analysis*

1. INTRODUCTION

In the literature 'poverty' has been considered as one of the most important problems of developing countries. In fact poverty is a complicated, multidimensional and greatly discussed issue throughout the world. There are many definitions of poverty. For example, 'poverty is a situation in which a person has such a low income that he/she cannot avoid starvation' or 'poverty is a situation in which a person cannot fulfil his/her basic needs for living'. However, irrespective of semantic differences, by all definitions poverty is a despondent and miserable situation. Poor of every society experience the lowest utility band of that society. The biggest obstacle in improving the living standard of a person is poverty.

Poverty has been a continuous part of every society although with a difference in its incidence. Available literature on poverty indicates that high poverty rates can disturb the development process of a country in a number of ways. "No society can surely be flourishing and happy, of which by far the greater part of the numbers are poor and miserable" (Adam Smith 1776). Focus given towards poverty in recent decades by global bodies, such as the World Bank and United Nations Organisation, shows the grimness of this issue. At the Millennium Summit (2000) a Millennium Development Goal (MDG) was setup by the World Bank and United Nations Organisation to halve the extreme poverty till 2015 from its level of 1990. In the World Development Report of 1970s accumulation of physical capital was focused more to reduce poverty as compared to improvement in education and health. However, World Development Reports 1980s and 1990s uttered that improvements in health and education are important to promote growth in the incomes of poor people.

A reduction in poverty figures is commonly considered as a progress measure for developing countries. According to WDI (2008) anti-poverty programs are effectively resulting decline in poverty level bringing poverty at half of the level in 1990 as set by MDG. However, there are many serious concerns regarding this claim of success. For example, the achievement in poverty alleviation is not homogeneous throughout the world and elimination of widespread poverty is still a tough goal to achieve for many countries. Latest available estimates of the World Bank about poverty till 2005 reveal that about 25% of population is extremely poor around the world. One out of each four people is poor on the globe.

1.1. Problem Statement

Above stated overall figure describes only a part of the situation of poverty in the world. Rate of poverty reduction is not equal across countries. Some countries experienced high rates of poverty reduction in the past few years while many countries were unable to practice a considerable decline in poverty indices. Moreover, poverty reduction rates were also not constant for many countries during last decade. These differences of poverty alleviation rates among countries or within country over time, could be the results of different factors effecting poverty indices. Thus, empirical investigation about plausible poverty determinants is indispensable.

1.2. Objectives and Hypotheses

Most of the time policy makers follow the goal of higher per capita income or reduction of income inequality to achieve the objective of poverty alleviation. However, education level and health of the earning person in household is an important factor for poverty risk (risk of being or becoming poor) not only for himself/herself but also to his/her family. As better education and health may affect the earning of a person positively, therefore estimates of educational and health related variables will be of much use for anti-poverty policy perspective. The prime intention behind this study is to explore, does the overall education and health situation of a country have a considerable impact on poverty magnitude?

Thus, the study will test the following hypotheses:

1. Income growth affects the incidence of poverty
2. Improvements in education and health reduce poverty
3. Education is more effective than health to reduce poverty or vice versa.
4. Efficient use of public expenditures on education and health leads to poverty reduction

1.3. Significance of the Study

Generally, a theory is validated from empirical evidence and the empirical estimation requires theory as foundation of hypotheses. Therefore, this study is based on both theoretical discussion as well as empirical analysis. The study is distinctive because it investigates education and health as determinants of poverty in addition to the conventional income based determinants. An effective and less expensive policy for poverty eradication is crucial as public resources are not unlimited. Ascertaining the efficiency of different countries to combat poverty will help us to identify the key factor in poverty reduction. These findings will also help us to come forward with appropriate policy recommendations.

2. LITERATURE REVIEW

2.1. Concept of Poverty

In reality there is no common definition of poverty for which every one agrees. Although definitions differ on what has to be considered as basic human needs, yet central meaning of poverty in all the definitions revolves around the "lack of fulfilment of basic needs". A combination of wide range of aspects and situations of life together constitutes poverty (Mikkelsen 2005). Poverty has many dimensions, for some it is purely an economic matter, for others it has social aspects too. Social point of view can be further divided into sub categories, for example, political and psychological poverty, etc. Sen's work (1992, 2001) widened the view of poverty beyond financial deprivation. Lack of education or poor health can limit capabilities of individuals. Hence, people not enjoying education or health are to be considered as poor.

Even within the economic notion, ideas of absolute and relative poverty exist. From social point of view it is implicit that poverty is lack of resources, lack of access to education and health care, lack of access to clean drinking water, un-fulfilment of needs and little or no opinionated representation. On the other hand economic poverty means having no or few financial resources to fulfil basic requirements of daily life. It is a difficult task to quantify social aspects of poverty for measurement purposes. Therefore, economic measure of poverty is used frequently for empirical research.

Ravallion (2003) explained how different measures or variables used for poverty can lead to dissimilar results and if the approaches are different then these results are not legitimate enough to deny opponent's findings. He also stated that even the difference of data sources can also lead to different findings due to the diverse techniques and methods used for data collection.

2.2. Income Growth and Poverty

A comprehensive meaning of income in literature is "the consumption and savings opportunity available to an entity usually expressed in monetary terms" (Barr 2004). People are considered poor when they do not have enough income to fulfil their basic needs. Individual's income plays a key role in his/her poverty status when we consider the economic measure of poverty either absolute or relative because in both approaches the premise behind the measurement is income or expenditure. We can say that same is the case with GDP and GNP per capita of a country at aggregate level with regard to country's poverty echelon.

Impact of growth on poverty mostly depends upon how this growth has been shared by the population of a country. If the most part of the economic growth is received by the rich then even high rates of growth will not reduce number of poor to large extent. It is logical to consider that an income growth will help less to reduce poverty in the presence of higher income inequality whereas income growth will help more to reduce poverty if income inequality is lesser in the society. Similarly if income inequality is rising as income grows then this income growth will not help the poor of that country.

Empirical studies reported mixed evidence regarding impact of growth on poverty incidence. Some studies exhibit robust poverty reduction effect of growth while others show slightest impact of growth on poverty. Pro-growth proponents are of the view that an increase in the per capita income of a country will ultimately leads to a decrease in the number of poor by increasing the income of individuals and vice versa. It is a familiar notion in literature that higher growth rates of per capita income ultimately leads to poverty reduction. On the other hand it is also a view that observed per capita income growth rates are not entirely capable of achieving the goal of poverty alleviation. The growth can even be anti-poor as happened in some countries. For this reason some of the pro-growth proponents consider growth as a necessary condition but not the sufficient condition for poverty alleviation. Generally, growth rate of per capita income has been given a central objective status in poverty reduction programs throughout the world. However, countries experienced poverty reduction through economic growth in fact focused on the productive use of labour, the only asset owned by the poor (Squire 1993). This finding clearly states that only pro-poor growth can help to reduce poverty significantly.

Some studies using regression analysis suggest that there is strong association between growth rates of average living standards and rates at which absolute poverty reduces (Ravallion and Chen 1997, Ravallion and Datt 1996, Ravallion and Datt 2002, Besley and Burgess 2003). Demery and Squire (1996) analyzed six African countries for the relationship of poverty with growth and income inequality. They found that in all the countries growth was more effectual toward incidence of poverty as compared to inequality.

On the other hand there are serious concerns whether focusing on growth promise to help the poor of country or not. Some studies show that economic growth does not guarantee adequate reduction in poverty as in case of some countries it has been observed. The World Bank's intervention to reform agriculture in the Philippines has resulted in anti-poor outcome even the rate of economic growth was satisfactory in the Philippines during that period (Borras et al. 2007). Gunetilleke (2000) reported that in Sri Lanka poverty reduction rate was below than expected at the observed rate of economic growth. These findings ask for careful analysis of poverty and growth.

A recent work of Duclos and Verdier-Chouchane (2010) demonstrated that due to different patterns of income inequality, growth in South Africa has been anti-poor relatively over

the period of 1995-2005. On the contrary, growth was absolutely pro-poor in Mauritius over the period 2001-2006. Empirical evidence suggests that experiences of growth and poverty reduction vary from country to country. The above mentioned literature shows that income growth may or may not reduce incidence of poverty at same or adequate rate. The role of economic growth in poverty alleviation depends upon how much anti-/pro-poor the growth is?

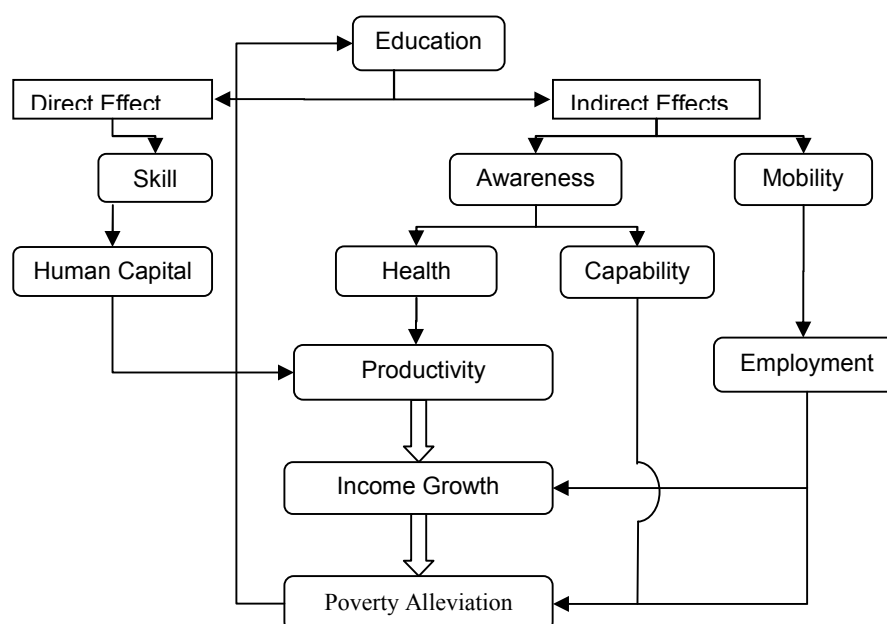
2.3. Education and Poverty

People having knowledge and skills are commonly known as human capital and basic source for acquisition of human capital is formal education. According to human capital theory, education is an investment decision made by individuals, which will help them in future to get returns. In literature it has been argued that economic role of education or human capital is to foster the economic growth by increasing income of masses. Empirical evidence exists in favour of the view that higher the human capital, higher will be the growth rate of income. This is also correct for an individual who earns comparatively more than his/her fellow being who is relatively less educated. Different rates of return for different schooling levels have been calculated throughout the world. These rates vary from region to region depending upon various factors¹.

Goh, Luo and Zhu (2009) investigated the effect of attained education on poverty. Their finding was that education played an increasingly important role in household income determination for both urban and rural areas. Income gaps have increased between households with more and less human capital endowment. Sylwester (2000) used data of many countries and showed fairly similar results that public education expenditures appear to be associated with a decrease in the level of income inequality.

According to Berg (2008) "this connection between education and poverty works through three mechanisms. Firstly, more educated people earn more. Secondly, more (and especially better quality) education improves economic growth, economic opportunities and incomes. Thirdly, education brings wider social benefits that improve economic development and especially the situation of the poor, such as lower fertility, improved health care of children and greater participation of women in the labor force". Education influences both, the ability of the individuals to earn income and their decisions which increase the probability of success in lifetime. Thus, direct and indirect impacts of education on poverty can be illustrated as shown in figure 1.

Figure 1: Impact of Education on Poverty Alleviation²



¹ In his introduction to the Wealth of Nations, Adam Smith (1776, p. 1) states that the proportion between the annual produce of a nation and the number of people who are to consume that produce depends on "the skill, dexterity, and judgment with which its labour is generally applied."

² Figure 1 has been taken from Janjua and Kamal (2011).

As discussed previously education can impact poverty in many ways other than improving human capital. There are a number of externalities of education and these can help poor to get out of poverty status. For example, reading ability can help to understand instructions on a medicine or on a fertilizer bag or even a general health care notice in newspaper. Obviously, instructions on medicine will help to be healthy and instruction on fertilizer bag can help to increase output of an agriculture farm. Similarly, a basic analytical skill may help a person to compare different price packages in market and to prefer one according to his/her need. An educated father prefers education for its next generation due to its realized importance (Harper, Marcus and Moore 2003). These are few examples out of many externalities of education and there are many more externalities which have been discussed widely in the literature on human capital. It can be concluded that income effect and externalities of education help people to improve their life patterns in a number of ways and then these improved patterns help them to get rid of poverty. These conclusions suggest "education" as a key variable in poverty alleviation.

2.4. Health and Poverty

According to World Health Organization (WHO) health is defined as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity"³. In general, health is the level of functional and metabolic efficiency of human being. This efficiency is sometimes measured in terms of health condition of human being like Bio Mass Index (BMI). However, for health related analysis at country or global level different types of health measures are used in empirical studies, e.g. life expectancy, mortality rates, etc.

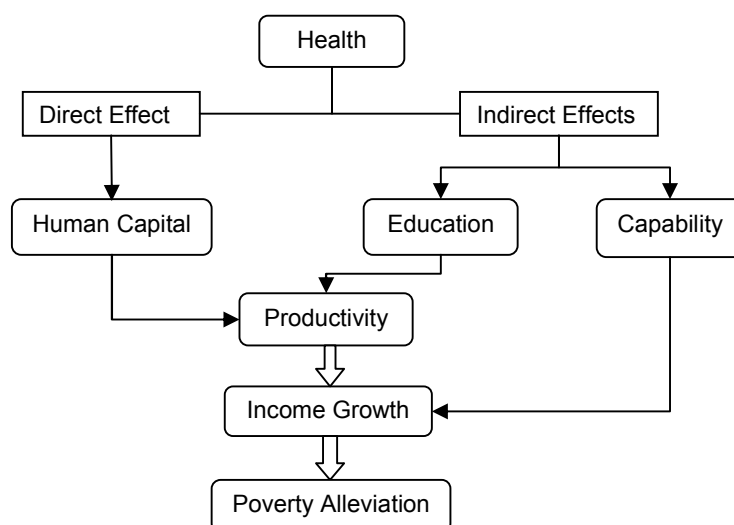
Better health is supposed to increase working and intellectual capabilities of people. Health is a vital element of human capital and is considered as requirement for increase in productivity of labour. Physical capability to do work depends upon individual's health status. Healthy workers are more productive and they can work for more hours of work per day as compared to unhealthy workers. This higher productivity and ability to do work more help individuals to earn more than others. Healthy people usually live longer than the sick people. It means they will have more life time to generate income.

Todaro and Smith argued that improved health also affects school performance and healthy people can benefit society in many ways. Healthy children are usually better in learning and they do not need to be absent from school or colleges due to sickness, which results growth and improvement in human capital of society. Gunetilleke (2000) stated that difficulties in accessing education and health facilities hindered people to gain advantages of improved education and health. Access of poor to education and health was one of his suggested priorities to reduce poverty effectively. Lawson (2004) found that ill health and long term sickness is associated with people moving into poverty. He further found that ill health is also causing reductions in assets like land and livestock because poor have to sell their assets to face ill health. Godlonton and Keswell (2004) used body mass index as proxy of health and found that family with more unhealthy (underweight) individuals and household heads are likely to be income poor. They also stated that these findings are invariant to the choice of poverty line.

Squire (1993) drew three conclusions; 1) Economic growth should be encouraged to induce productive use of labour so that poor can earn to get rid of poverty, 2) Public spending is an important source to improve health and education attainment of poor and 3) Provision of subsidized social services is better than direct cash transfer. Keeping in view the above literature we can illustrate different health attributes, which can affect poverty, as given away in figure 2. Thus, health is another important factor affecting the income of poor. In literature of health economics a view has been developed that weak health conditions limit the capacity to do work. In addition, low health conditions in itself are considered as an aspect of poverty in broader concept of poverty.

³ Official Records of the World Health Organization, no. 2, p. 100.

Figure 2: Impact of Health on Poverty Alleviation



Above discussion suggest that improved health can impact earning of individuals positively through different ways and consequently help them to escape from poverty. Therefore, health is an important asset, especially for poor people as most of poor people can earn only by providing labour.

3. CONCEPTUAL FRAMEWORK

As discussed before, claims exist in favor of both theories that economic growth helps the poor and may not help the poor to overcome the problem of absolute poverty. Another important concern is that whether the acquired growth is benefiting the poor or not. Same growth rate of per capita income can impact poverty to different extent in different countries depending on who is ultimate gainer of economic growth. If economic growth is anti-poor then it will not have a considerable impact on poverty reduction no matter how high is the rate of growth. On the other side a pro-poor growth can effectively reduce the poverty even if rate of growth is not very high.

Governments spend their revenues on both education and health as a part of public expenditure. Public spending on education and health reflects that how much a government is emphasizing on human development within a country. However, governments cannot increase these public spendings to an unlimited level as the revenue resources of governments are scared and choices have to be made to use these resources efficiently. In this scenario, along with the “amount” of reserved funds for public spending the “efficient use” of funds is equally important.

3.1. Universe of the Study

World Bank has classified all the world countries on the basis of their incomes in four groups, namely low income, lower middle income, upper middle income and high income countries. This study includes all the countries except high income countries, because absolute poverty is not a big issue in rich countries. Thus, a set of 40 developing countries (see appendix 1), for whom data requirements are fulfilled, is selected as a sample. Constraint of data availability restricted us to select 40 developing countries and to use data of 9 years from 1999 to 2007.

3.2. Methods of Estimation

Economic literature emphasizes on positive correlation between public spending on education and health and improvements in human capital. Investments in health and education are now considered by global entities as important means to reduce number of poor. It makes sense to assume that in a country choice of allocation of resources for education and health will possibly impact poverty trends.

Allocation of resources toward any policy of poverty reduction requires at least two tier empirical understanding. One, how much education and health improvements are correlated with poverty alleviation? Second, how efficiently a country uses its previously allocated funds in both the sectors? These empirical understanding will help governments to direct their limited resources toward more efficient and effective sector to achieve rapid poverty reduction rates. Governments usually spend on both sectors to achieve the larger social development goal. For example, governments may have the objectives of higher net enrollments as well as improved health of masses. However, indirectly poverty reduction or improved income distribution could be one of the social goals of government behind these public spending. Let us assume that, as inputs, a country has two expenditures i.e. education expenditure and health expenditure.

In function form it can be written as

$$I = \{\text{education expenditure, health expenditure}\} \dots (1)$$

We also assume that, as outputs, the country has four objectives which can be written as

$$O = \{\text{reduction in poverty, reduction in income inequality, increased enrollments, increased life expectancy}\} \dots (2)$$

According to broader concept of poverty these four objectives can be considered as anti-poverty objectives⁴.

In this study a non parametric method named as "Data Envelopment Analysis (DEA)" has been used to obtain results. In our case governments are assumed as DMUs which takes decisions regarding how much funds should they allocate to spend on education and health. DEA will help us to identify the most efficient, less efficient and inefficient countries by using above assumed input/output variables.

Basic CCR model, which is named after Charnes, Cooper & Rhoades, is used in this study with constant return to scale (CRS). It is assumed that countries want to maximize the output at a given input cost, i.e. education and health expenditure, to achieve efficiency. In literature this efficiency is also known as technical efficiency.

4. DATA ANALYSIS AND RESULTS

4.1. Exploratory Data Analysis

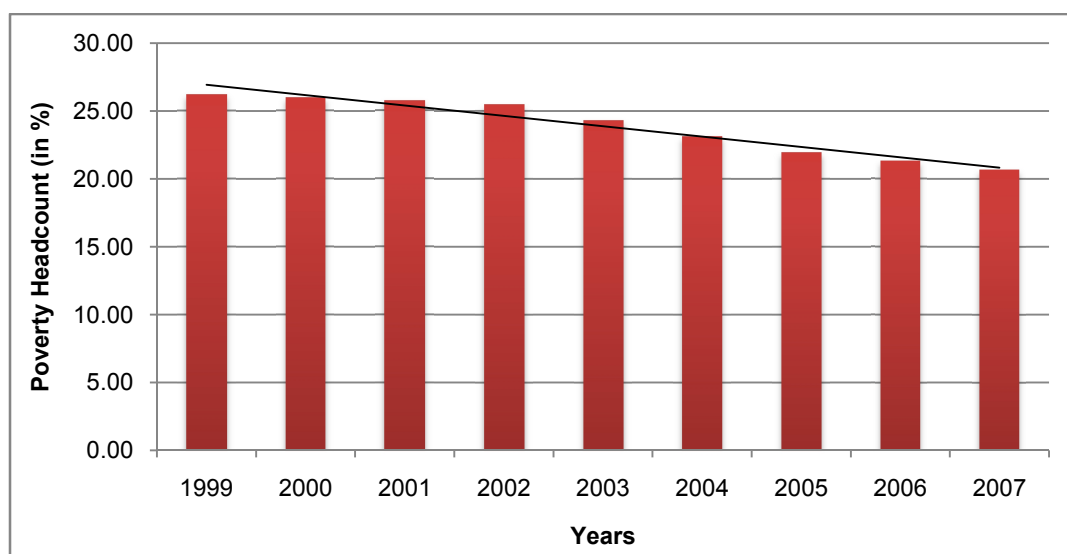
Figure 3 shows the average trend of incidence of poverty for 40 selected countries at aggregate level during the period of 1999-2007⁵.

⁴ It is assumed that the set of output variables do not strictly define poverty status of a country. However, it's a desired set of outputs as any improvement in these outputs will help to reduce poverty, either commonly known economic poverty or broadly defined poverty.

⁵ For Box plot graph of poverty headcount data see Appendix 4.

309

Figure 3: Average Trend in Poverty (40 countries, 9 years)



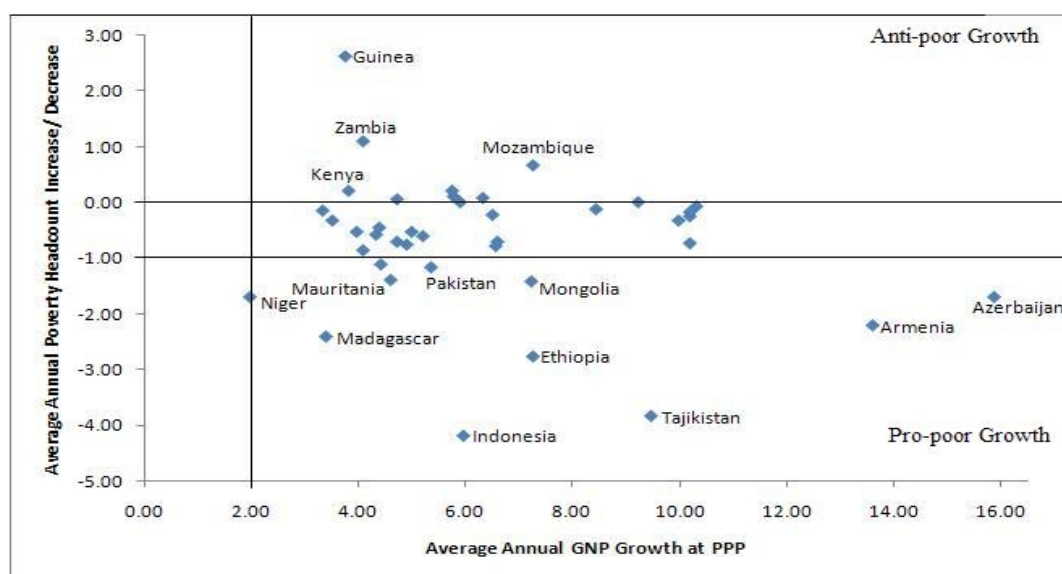
310

311

312

313

Figure 4: Groups of Countries with Pro-/Anti-Poor Growth



314

315

316

317

318

Figure 4 places 40 countries on their respective positions according to their average GNP per capita growth and average increase or decrease in poverty incidence over the period of 9 years (1999-2007).

319

320

321

322

323

324

325

326

327

328

These pro-/anti-poor classifications and ranks of countries do not provide exact information about what percentage of growth is directed toward poor. However, they provide information about what percentage of poor is getting benefit from economic growth. It is observed that poverty has been declining at the rate little higher than half percent per year. As population of world is also increasing continuously therefore, this progress cannot be considered as "satisfactory". In figure 4, countries which are above the upper horizontal line experienced increase in poverty on average in 9 years period. Countries which are below the lower horizontal line experienced a decrease of more than one percent on average in poverty incidence. We can see that all the selected countries have more than 2 percent average GNP per capita growth. However, we can classify countries into three groups. Through this classification we can identify

how income growth in each group has affected the poor. In some countries income growth was anti-poor and in other countries income growth was pro-poor⁶. For third type of countries income growth was turned more toward rich and less toward poor as it did not help one percent of the poor. We can also observe that many of the countries are in this third group.

Even within specified classification we can rank countries from most pro-poor to least pro-poor and from least anti-poor to most anti-poor. For example, Niger experienced much more pro-poor income growth as compared to Azerbaijan as in both countries poverty fell on average 1.70% per year despite the large difference between growth rates of both countries. In our set of 40 countries Indonesia is starkest example with average poverty reduction of 4.20% per year. On the other side Guinea was worst as incidence of poverty increased on average of 2.64% per year even the growth rate was 3.78 during that period. In Pakistan average growth rates were decent and average per year poverty reduction was also moderate. We can categorize Pakistan's income growth as fairly pro-poor income growth. Figure 5 provides even more precise information regarding the country's pro-/anti-poor income growth status. Figure 5 is obtained from ratio of average poverty reduction to average growth rate. Figure 4 and 5 together then we can understand that only having high growth rates do not ensure sufficient poverty reductions. Although economic growth rate in Niger was hardly fair even then poor of Niger benefited from it significantly. On the lowest side growth rate in Guinea was fair. However, this income growth worsened the condition of poor in Guinea instead of serving them.

As stated before, ratio of education and health expenditure to the total government expenditure tells us how much a country is focusing on its human capital. Figure 6 and 7 show education and health expenditures of all countries as a percentage of government's total expenditure. In resource allocation toward education Lesotho is on top with an average of 13% of total government spending and Cambodia is on bottom with an average of 1.6% of total government expenditure. South Africa is highest spender of health expenditure with an average of 8.31% of total government expenditure and Indonesia is lowest with an average of 1.97% of total government expenditure.

Following table shows the correlations between selected variables:

Table 1: Correlations between Selected Variables

	PHC	GINI	NES	LE
PHC	1			
GINI	0.23888	1		
NES	-0.82538	-0.25867	1	
LE	-0.81316	-0.14999	0.76553	1

PHC= Poverty Headcount GINI= Gini Coefficient NES= Net Secondary Enrollments
LE= Life Expectancy

The strongest correlation exists between net enrollments in secondary education and poverty headcount. Negative sign indicates that an increase in net secondary enrollments is strongly associated with a decrease in incidence of poverty. Second strongest correlation exists between years of life expectancy and poverty headcount and it is also negative. Both the education and health measures are also negatively correlated with income inequality in same pattern (education more and health less correlated with negative sign). Positive correlation between poverty headcount and income inequality suggest that a rise in income inequality is positively correlated with rise in poverty headcount.

⁶ When any country experiences at least one percent reduction on average in poverty incidence then we assume its growth as pro-poor growth. On the other hand if any country's poverty incidence is rising on average then we consider its growth as anti-poor growth.

Figure 5: Ranking of Countries according to Pro-/Anti-Poor Growth

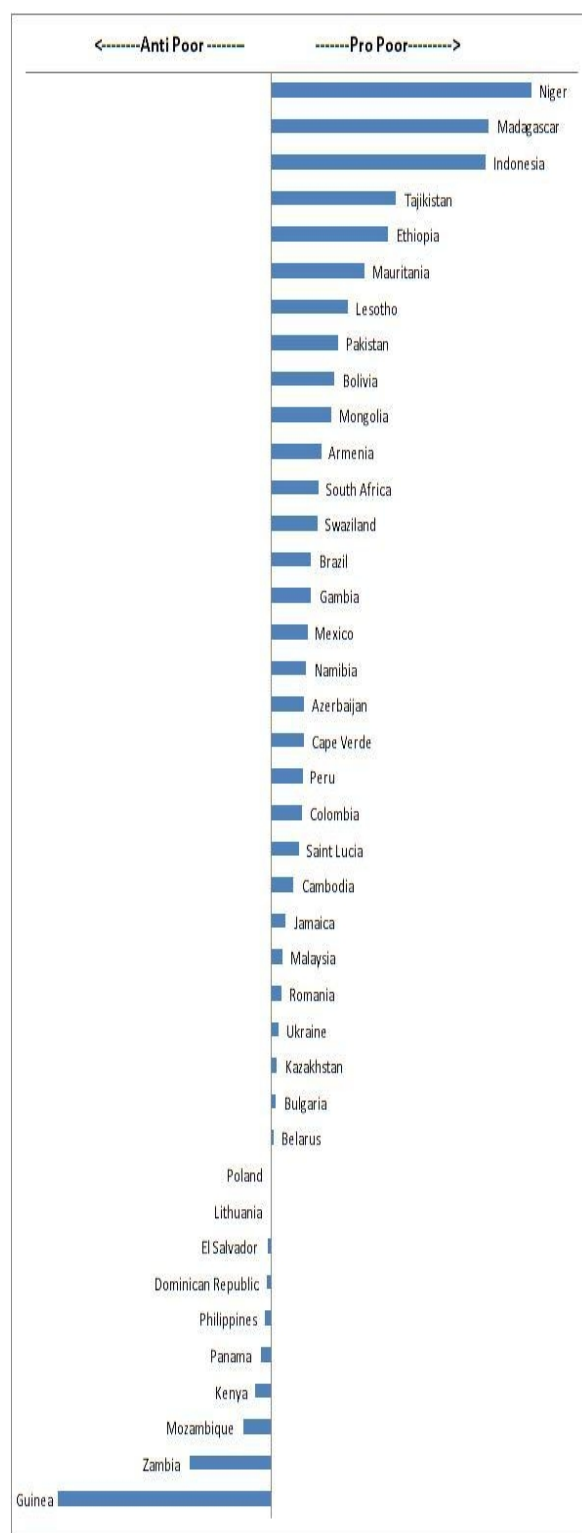
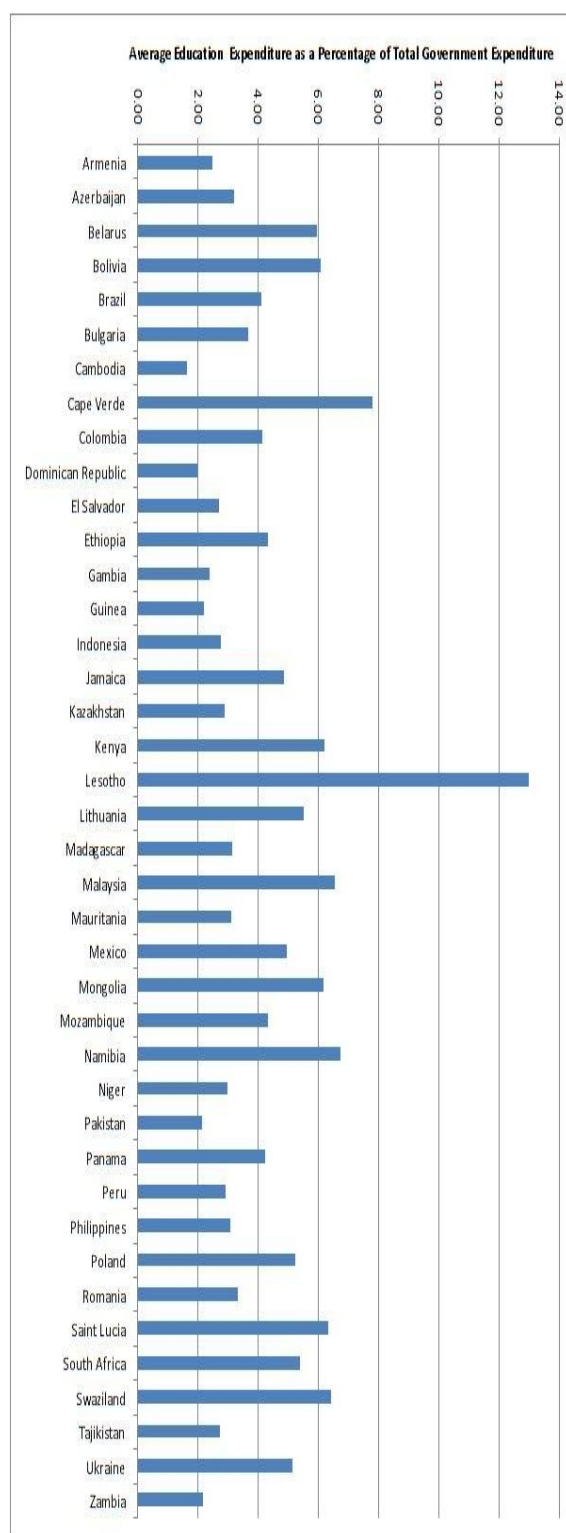


Figure 6: Education Expenditure as % of Total Government Expenditure



4.2. Data Envelopment Analysis

As stated before let us assume that a country has four goals when it decides to spend on education and health. This assumption allows us to consider following sets of inputs and outputs.

$I = \{\text{education expenditure, health expenditure}\} \dots (1)$

$O = \{\text{reduction in poverty, reduction in income inequality, increased enrollments, increased life expectancy}\} \dots (2)$

Figure 8 shows the estimated efficiencies of selected set of 40 countries. On the basis of their efficiency we can classify these countries into three main groups (100% efficiency = most efficient countries, 50% to 99.9% efficiency = less efficient countries, 0% to 49.9% efficiency = inefficient countries).

Before going to figure 8 it is worth noting, these efficiencies are calculated by using all input and output variables⁷. A country can be most efficient if it achieves highest efficiency in any input-output combination. For example, if country 'A' is most efficient as compared to other countries in using input 'one' to produce output 'one' then it will be at efficiency level of 100%. On the other hand if a country 'B' is most efficient as compared to other countries in using input 'two' to produce output 'two' then it will also be at efficiency level of 100%.

Another important understanding is that DEA uses input-output ratios to estimate efficiencies. Therefore, it is simply possible that in absolute terms a country shows less progress and in DEA it becomes relatively more efficient as compared to a country which was similar in absolute progress. Similarly, it can also happen in opposite direction.

Figure 8 shows that Azerbaijan, Cambodia, Dominican Republic, Indonesia and Pakistan were the 5 most efficient countries, 17 countries were less efficient and 18 countries were inefficient. These results show efficiency of countries while considering all output variables.

However, we can dig out even more useful information if we do this analysis for a single output. For example, if we want to know that what is the efficiency level of country if the government's objective was only to reduce absolute poverty? Figure 9 shows efficiency of all countries in absolute poverty reduction by using education and health expenditure as inputs. Most efficient country in absolute poverty reduction was Indonesia and most inefficient country was Guinea. 11 countries were in less efficient category and 28 countries were inefficient to reduce incidence of poverty. Pakistan was on 5th from top in achievements against absolute poverty.

An important concern here is that why countries differ in efficiencies? It could be the case that if a country is using its education expenditure efficiently to improve educational output (net enrollments in secondary education) then this efficiency may help the country to fight well against absolute poverty. Similarly, efficient use of health expenditure to improve health indicator (life expectancy) may also help to shrink poverty.

⁷ All DEA calculations were done by taking averages of both input variables and by taking total progress of all output variables. Rescaling of negative outputs was also done to convert them to minimum positive outputs, as outputs were necessary to be positive. For other efficiencies like each output separately against all inputs see appendix 2. It will provide additional help to understand figure 9.

Figure 7: Health Expenditure as % of Total Government Expenditure

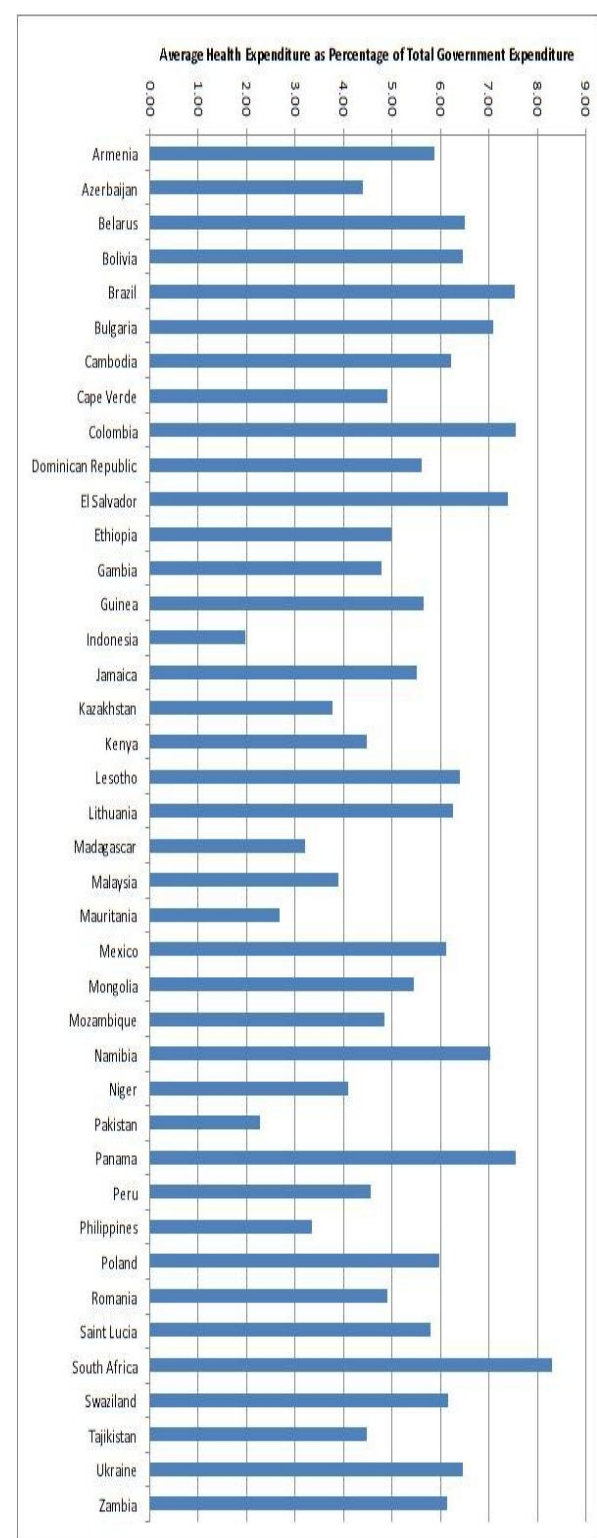
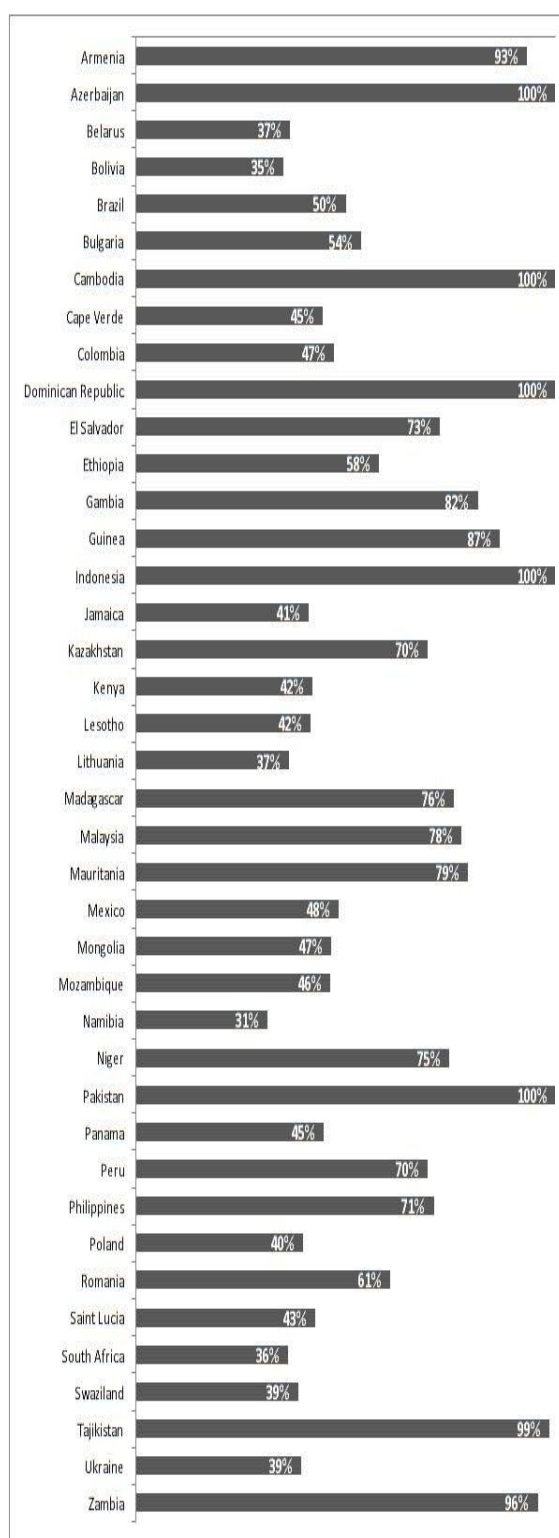


Figure 8: Efficiency Ranking with all Inputs and all Outputs



415

416

417

It is also important to know that whether efficiency in educational output (i.e. net enrollments) is more important or efficiency in health output (i.e. life expectancy) is more important. Correlations between efficiencies of table 2 can provide us useful understanding.

Table 2⁸: Correlations between Efficiencies of Selected Variables:

Absolute Poverty, Education and Health

	Efficiency in Absolute Poverty Reduction (inputs=edu_exp, health_exp) (output=reduction in absolute poverty)
Efficiency in Education (input=edu_exp) (output=net enrollments)	0.62
Efficiency in Health (input=health_exp) (output=life expectancy)	0.59

We can see that efficiencies of absolute poverty are highly correlated with efficiencies of education and health. These correlations suggest that if a country can efficiently use its education or health expenditure to improve respective educational and health outcomes then the chances are more to experience reduction in absolute poverty. In general we can also assert that although both education and health sectors are important however, education sector plays more important role in poverty alleviation as compared to health sector.

We can also find the efficiency level of country in reducing income inequality. Figure 10 shows efficiency of all countries in income inequality reduction by using education and health expenditure as inputs. Pakistan and Azerbaijan was two most efficient countries in reduction of income inequality during this period. 15 countries were less efficient and 23 countries were inefficient in reducing income inequality.

Table 3: Correlations between Efficiencies of Selected Variables:

Income Inequality, Education and Health

	Efficiency in Income Inequality Reduction (inputs=edu_exp, health_exp) (output=reduction in income inequality)
Efficiency in Education (input=edu_exp) (output=net enrollments)	0.71
Efficiency in Health (input=health_exp) (output=life expectancy)	0.55

We can see that efficiencies of income inequality reduction are also strongly correlated with efficiencies of education and health. These correlations suggest that if a country can efficiently use its education or health expenditure to improve respective educational and health measures then the chances are more to experience reduction in income inequality. In general we can also assert that although both education and health sectors are important however, education sector played much more important role in reducing income inequality as compared to health sector.

⁸ It is important to note that these and forthcoming correlations are calculated on the basis of relative efficiencies and not on the basis of the original data. For details of efficiencies of all countries see appendix 2 and 3.

Figure 9: Efficiency Ranking with all Inputs and one Output: Absolute Poverty

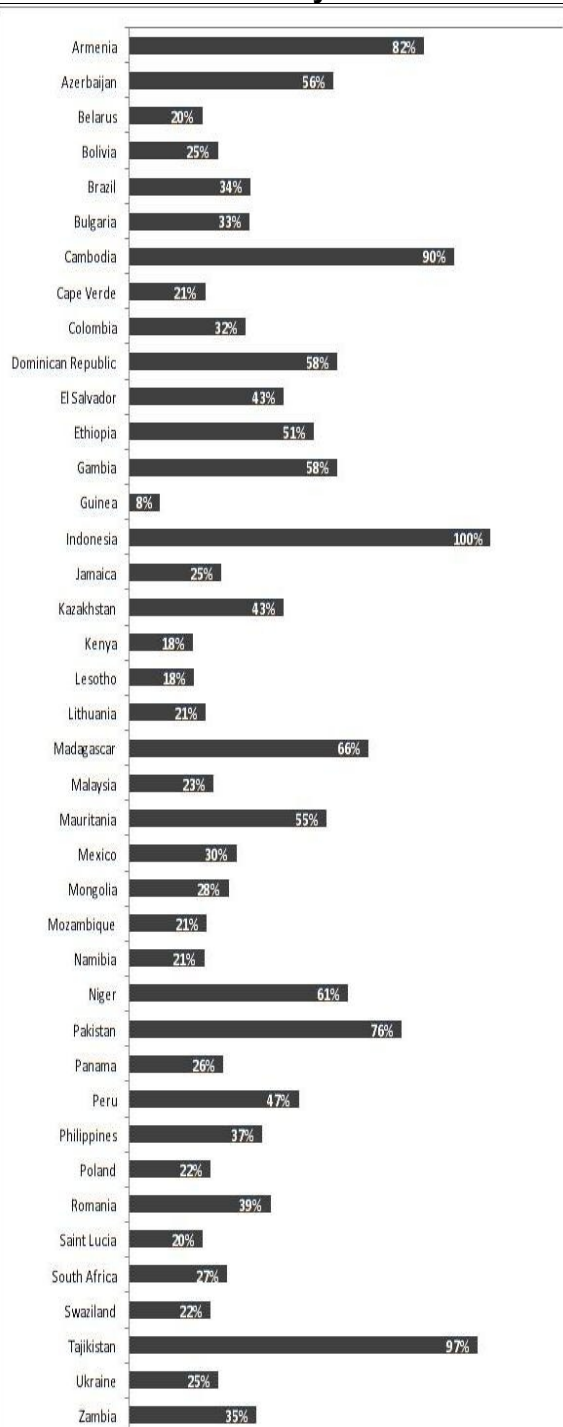
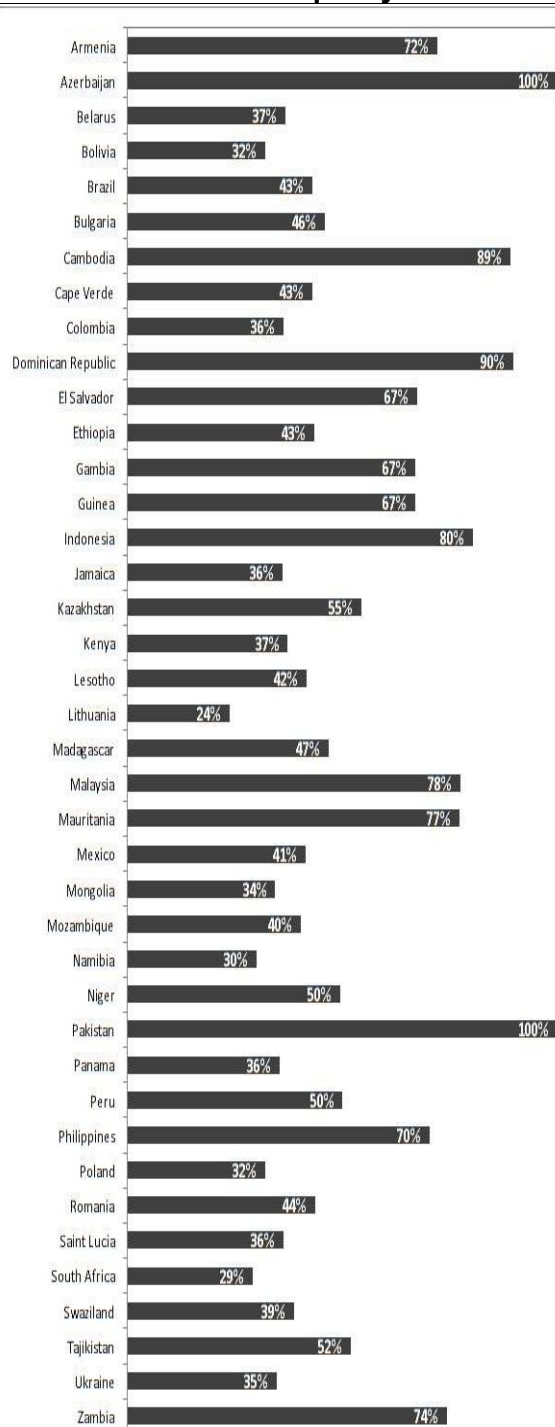


Figure 10: Efficiency Ranking with all Inputs and one Output: Income Inequality



5. CONCLUSIONS AND RECOMMENDATIONS

The results of estimations of this study enable us to draw following conclusions. First, it can be ascertained from the results that in selected 40 countries some countries experienced pro-poor income growth and income growth in other countries did not help the poor. Second, achieving decent or high growth rates of income do not ensure (as suggested in trickle-down theory) poverty reduction at similar pace. Third, improvements in educational and health outcomes are strongly and negatively associated with poverty incidence. However, educational

improvements appear to be more strongly correlated with decline in poverty headcounts as compared to health improvements. Fourth, educational and health outcomes are also negatively but moderately correlated with level of income inequality. Fifth, efficient use of public expenditures on education and health not only result in improved educational and health outcomes (net secondary enrolments and life expectancy), but it also permit a rapid poverty alleviation and improved income inequality.

Two major conclusions can be drawn from above estimates of whole data set. First, per capita income growth was not key contributor in poverty alleviation in selected countries during the observed period. Second, improved education and health emerged as main contributor in poverty alleviation.

As discussed earlier, enhancement of earning ability of people is due to better education and health. These both improvements interestingly may influence the poverty to decrease even if there is low growth in overall per capita income. Due to increased income of the poor even at low income growth poor can be uplifted in a sustainable way. This is the difference between “making people enable” and “making people capable”.

The most suitable way to give a share from income growth to local poor is to provide them required education, skills and better health facilities. This will also be a permanent barrier to prevent people going back into poverty trap because less productive workers with lower skills are likely to be laid off first, when ever any business goes for contraction. Keeping in view the above mentioned conclusions the economic policy in developing countries, without neglecting income growth, shall primarily focus on promoting education and health services to ultimately achieve the goal of poverty alleviation.

REFERENCES

- Barr, N., Problems and Definition of Measurement. In Economics of the Welfare State, 2004.
- Besley, Timothy and Burgess, Robin, Halving Global Poverty. American Economic Association, The Journal of Economic Perspectives, Summer, 2003, Vol. 17, No. 3, pp. 3-22.
- Berg, Servaas van der, Poverty and Education. The International Institute for Educational Planning (IIEP) and The International Academy of Education (IAE), 2008.
- Borras, Saturnino M. Carranza, Jr., Danilo & Franco, Jennifer C., Anti-Poverty or Anti-Poor? The World Bank's Market-Led Agrarian Reform Experiment in the Philippines, Third World Quarterly, 2007, Vol. 28, No. 8, pp. 1557-1576
- Datt, Gaurav and Ravallion, Martin. Is India's Economic Growth Leaving the Poor Behind? The Journal of Economic Perspectives, 2002, Vol. 16, No. 3, pp. 89-108.
- Demery, Lionel and Squire, Lyn, Macroeconomic Adjustment and Poverty in Africa: An Emerging Picture. The World Bank Research Observer, 1996, Vol. 11, No. 1, pp. 39-59
- Duclos, Jean-Yves and Verdier-Chouchane, Audrey, Analyzing Pro-poor Growth in Southern Africa: Lessons from Mauritius and South Africa, 2010, Working Paper No. 115
- EFA (UNESCO), Education for all Global Monitoring Report, Strong Foundations: Early Childhood Care and Education, 2007.
- GOH, Chor-Ching, LUO, Xubei and ZHU, Nong, Income Growth, Inequality and Poverty Reduction: A Case Study of Eight Provinces in China, China Economic Review, 2009
- Gunetilleke, Neranjana, A Note on the Sri Lankan Experience in Poverty Reduction. The Pakistan Development Review, 2000, 39 : 4 Part II, pp. 1193–1204
- Harper, C., Marcus, R. and Moore, K., Enduring Poverty and the Conditions of Childhood: Lifecourse and Intergenerational Poverty Transmissions. World Development, 2003, 31(3): 535-554.
- Janjua, Pervez Zamurrad and Kamal, Usman Ahmed, The Role of Education and Income in Poverty Alleviation: A Cross-Country Analysis, The Lahore Journal of Economics, 2011, 16:1, pp. 143-172

503 Lawson, David, The Influence of Ill Health on Chronic and Transient Poverty: Evidence from
504 Uganda, 2004, CPRC Working Paper No 41. ISBN Number 1-904049-40-0
505 Mikkelsen, Britha, Methods for Development Work & Research, Sage, Second Edition, 2005, pp.
506 224-231
507 Ravallion, Martin, The Debate on Globalization, Poverty and Inequality: Why Measurement
508 Matters, International Affairs (Royal Institute of International Affairs 1944-), 2003, Vol. 79, No.
509 4, pp. 739-753
510 Ravallion, Martin and Chen, Shaohua, What Can New Survey Data Tell Us about Recent
511 Changes in Distribution and Poverty? Oxford University Press, The World Bank Economic
512 Review, 1997, Vol. 11, No. 2, pp. 357-382.
513 Ravallion, Martin and Datt, Gaurav, How Important to India's Poor Is the Sectoral Composition of
514 Economic Growth? Oxford University Press, The World Bank Economic Review, 1996, Vol.
515 10, No. 1, pp.1-25
516 Squire, Lyn, Fighting Poverty, American Economic Association, The American Economic Review,
517 1993, Vol. 83, No. 2, pp. 377-382.
518 Sylwester, Kevin, Can Education Expenditures Reduce Income Inequality? Economics of
519 Education Review 21, 2002, 43–52
520 Todaro, P. Michael and Smith, C. Stephen, Economic Development, Pearson Education, 2007
521 World Bank, World Development Indicators, 2008
522 World Development Report, 2000, 2004 & 2007

523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552

Appendices

Appendix 1: List of Selected Sample Countries

No	Ids	Country Name	No	Ids	Country Name
1	ARM	Armenia	21	MDG	Madagascar
2	AZE	Azerbaijan	22	MYS	Malaysia
3	BLR	Belarus	23	MRT	Mauritania
4	BOL	Bolivia	24	MEX	Mexico
5	BRA	Brazil	25	MNG	Mongolia
6	BGR	Bulgaria	26	MOZ	Mozambique
7	KHM	Cambodia	27	NAM	Namibia
8	CPV	Cape Verde	28	NER	Niger
9	COL	Colombia	29	PAK	Pakistan
10	DOM	Dominican Republic	30	PAN	Panama
11	SLV	El Salvador	31	PER	Peru
12	ETH	Ethiopia	32	PHL	Philippines
13	GMB	Gambia	33	POL	Poland
14	GIN	Guinea	34	ROM	Romania
15	IDN	Indonesia	35	LCA	Saint Lucia
16	JAM	Jamaica	36	ZAF	South Africa
17	KAZ	Kazakhstan	37	SWZ	Swaziland
18	KEN	Kenya	38	TJK	Tajikistan
19	LSO	Lesotho	39	UKR	Ukraine
20	LTU	Lithuania	40	ZMB	Zambia

558

Appendix 2: Estimated Efficiencies of Selected Variables with 2 Inputs (%)

Output(s)	All 4	Poverty	Inequality	NES	LE
Country Name	Efficiency	Efficiency	Efficiency	Efficiency	Efficiency
Armenia	93	82	72	43	75
Azerbaijan	100	56	100	53	65
Belarus	37	20	37	29	34
Bolivia	35	25	32	25	35
Brazil	50	34	43	43	47
Bulgaria	54	33	46	37	51
Cambodia	100	90	89	100	100
Cape Verde	45	21	43	30	39
Colombia	47	32	36	45	46
Dominican	100	58	90	99	86
El Salvador	73	43	67	58	64
Ethiopia	58	51	43	50	50
Gambia	82	58	67	78	79
Guinea	87	8	67	85	85
Indonesia	100	100	80	100	100
Jamaica	41	25	36	21	41
Kazakhstan	70	43	55	44	70
Kenya	42	18	37	36	40
Lesotho	42	18	42	21	22
Lithuania	37	21	24	25	37
Madagascar	76	66	47	61	72
Malaysia	78	23	78	32	48
Mauritania	79	55	77	51	73
Mexico	48	30	41	45	41
Mongolia	47	28	34	46	38
Mozambique	46	21	40	31	46
Namibia	31	21	30	29	30
Niger	75	61	50	49	73
Pakistan	100	76	100	90	100
Panama	45	26	36	35	45
Peru	70	47	50	65	70
Philippines	71	37	70	63	69
Poland	40	22	32	30	40
Romania	61	39	44	36	61
Saint Lucia	43	20	36	41	36
South Africa	36	27	29	34	30
Swaziland	39	22	39	18	26
Tajikistan	99	97	52	80	74
Ukraine	39	25	35	18	39
Zambia	96	35	74	96	77

559

560

561

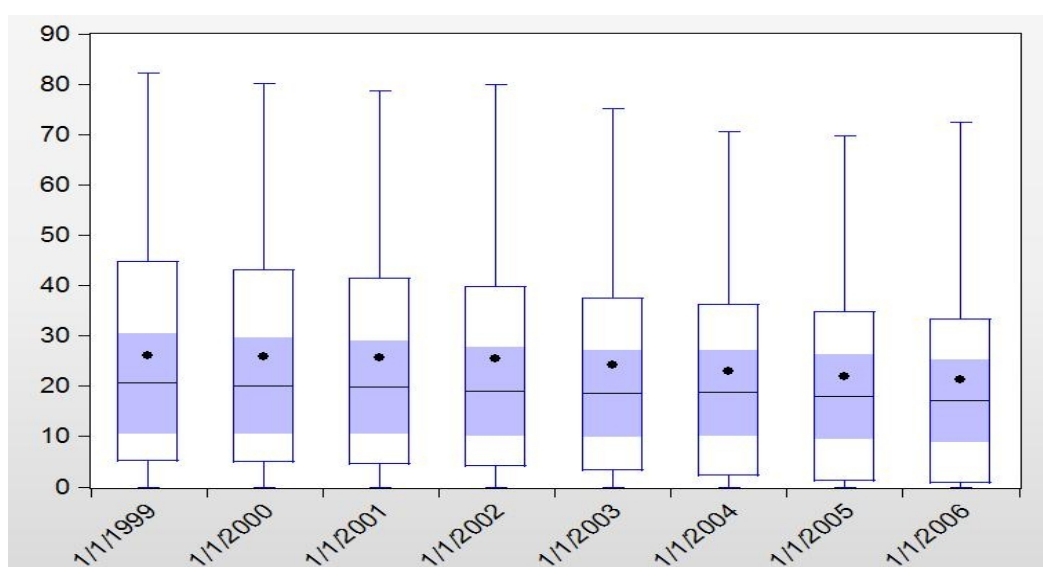
Appendix 3: Estimated Efficiencies of Selected Variables with 1 Input (%)

Output(s)	NES	LE		NES	LE
Country Name	Efficiency	Efficiency	Country Name	Efficiency	Efficiency
Armenia	36	33	Madagascar	41	62
Azerbaijan	38	44	Malaysia	17	48
Belarus	20	28	Mauritania	33	67
Bolivia	17	30	Mexico	31	31
Brazil	32	25	Mongolia	30	35
Bulgaria	29	27	Mozambique	21	37
Cambodia	100	32	Namibia	19	25
Cape Verde	17	39	Niger	35	50
Colombia	34	25	Pakistan	61	85
Dominican Republic	87	34	Panama	27	25
El Salvador	50	26	Peru	47	43
Ethiopia	34	40	Philippines	43	57
Gambia	61	40	Poland	20	32
Guinea	72	36	Romania	26	39
Indonesia	63	100	Saint Lucia	27	32
Jamaica	14	33	South Africa	25	18
Kazakhstan	31	50	Swaziland	12	23
Kenya	23	39	Tajikistan	59	43
Lesotho	9	22	Ukraine	13	28
Lithuania	17	29	Zambia	84	30

562

563

Appendix 4: Box-Plot of Poverty Headcounts



565