Declining Absolute Poverty in Nepal: Analysis of Contributing Factors

A Research Paper Submitted to
Graduate School of Public Policy,
The University of Tokyo

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Masters of Public Policy/International Program

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20th May, 2014

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Abstract

Characterized as a least developed country of South Asia, Nepal has been facing absolute poverty, a socioeconomic problem, throughout the country for the last several decades. Though the absolute poverty rate is still high at 23.8% in 2014, its trend is declining despite the challenging political situation of the country. Why is absolute poverty declining as a trend in Nepal despite the political instability in the past decades? It is needless to say that poverty is a multidimensional phenomenon and multiple factors affect its intensity and trend. This research paper attempts to analyze multiple contributing factors of declining poverty in Nepal by utilizing secondary data.

1. Introduction

Despite economic, institutional and technological progress in most developing countries, extreme poverty is still widespread around the world. According to World Bank Poverty Indicators, 1,011 million people in more than 145 counties lived on less than $1.25 a day (measured at PPP) in 2011. Though the number of affected people remains alarmingly high, absolute poverty in the world has been declining over time. In 1990, 36.4% of the world population was under the poverty line and the poverty ratio dropped to 14.55% in 2011. Nevertheless, the proportion of extremely poor people was not evenly distributed around the world; it varied from region to region and country to country.

In terms of extreme poverty concentration, South Asia (SA) is the second largest region of the world, following Sub-Sahara Africa. The SA region includes eight SAARC member countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka). The World Bank reports that more than 1.6 billion people lived in this region in 2003 and 24.5 percentage of these people lived under extreme poverty (below $1.25 per day) in 2011. Regardless of this fact, the head count ratio of absolute poverty has declined over the years while the total population of the region has risen in number. While the head count ratio of absolute poverty was at 54% of total population in 1990, the ratio declined by more than half to 24.5% in year 2011. Table 1 summarizes the poverty trend of the World and South Asia.

Table 1: Absolute poverty trend in terms of head count ratios: World and South Asia

Geography	Head count ratio at $1.25 per day PPP	
	Year 1990	Year 2011
World	36.4%	14.55%
South Asia	54.1%	24.5%
Nepal	68.0% (1996)	23.7%

Source: http://povertydata.worldbank.org/poverty/home/

All of the South Asian countries have been facing, in some way or the other, a common social economic problem of absolute poverty for the last several decades. More significantly, along with the world poverty trend, the proportion of extreme poverty of South Asian countries has been declining with different pace. Figure 1 depicts the trend of poverty headcount ratios in South Asian countries. It indicates that Bangladesh, India, Nepal and Pakistan had relatively high poverty ratios (below $1.25 per day) at around or above 50% in the mid-1990s. In particular, Nepal had the highest absolute poverty ratio at 68%, whereas Sri Lanka had the lowest absolute poverty ratio at 16.3%. In addition, the figure shows that every country in South Asia has made significant progress in reducing absolute poverty over the last 15 years.

Figure 1: Trend of Poverty Head Count Ratio in South Asian Countries

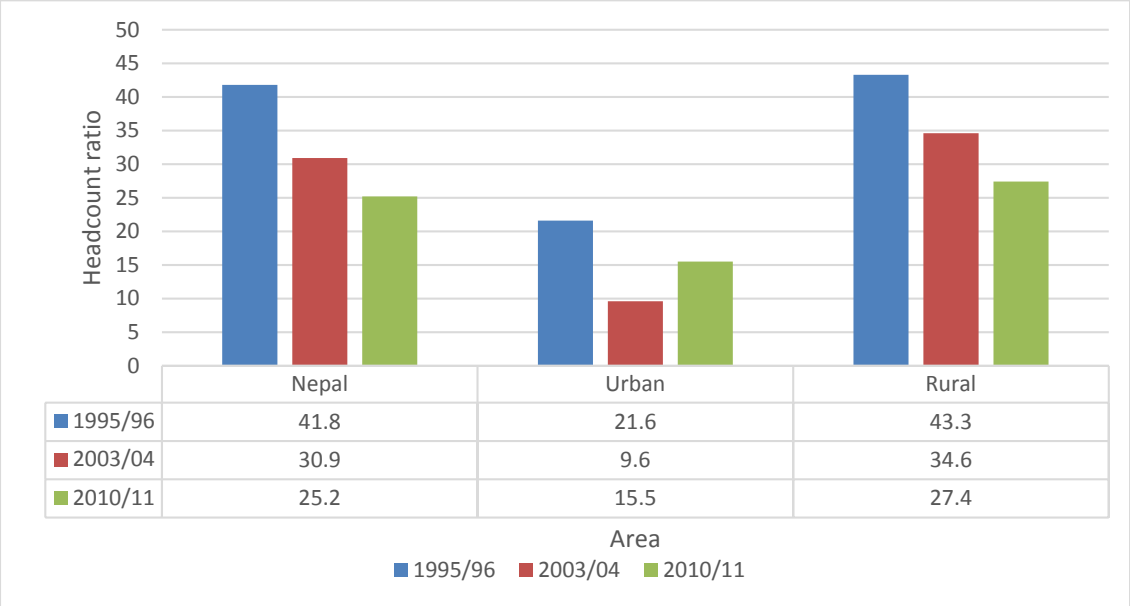
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Bangladesh			60.9				58.6					50.5					43.3
Bhutan										24							10.2
India	49.4											41.6					32.7
Nepal			68							53.1							23.7
Pakistan				48.1		29.1			35.9			22.6			17.2		12.7
Srilanka			16.3						14					7			4.1

Source: http://povertydata.worldbank.org/poverty/home/ accessed on 3/30/2015.

The slope of the poverty ratio for each country in the figure indicates how fast poverty reduction has taken place. The rate of poverty reduction in Bangladesh and India seems to have been slow while that of Nepal has been fast, especially after 2003, compared to other South Asian countries. For example, Bangladesh had a lower extreme poverty ratio (60%) than Nepal (68%) in 1996, but the situation reversed itself over time. That is, in year 2010, Bangladesh had a higher extreme poverty ratio (43.3%) than Nepal (23.7%). This fact supports the argument that Nepal has made significant progress on absolute poverty reduction over the last decades.

Nepal has made significant progress on absolute poverty reduction despite the adverse political situation the country has faced in the past decades. It has witnessed many political changes during the last twenty years, i.e., the occurrence of armed conflict for 10 years, the declaration of a republic state, and the failure of first constitutional assembly. More importantly, the country is still in political transition. In spite of political flux in Nepal, the head count ratio of absolute poverty has been declining across the country, both in urban and in rural areas. The Nepal Life Standard Survey (NLSS), conducted in different time periods, shows that Nepal has been able to reduce absolute poverty by 16.6% points in terms of head count ratios over the last 15 years. During the same period, urban area poverty has been reduced by 12 % points whereas rural area poverty reduced by 15.9% points. Figure 2 shows that absolute poverty in urban areas, rural areas and nationally has declined as a trend.

Figure 2: Trend of Poverty by National Standard



Source: Derived from Central Bureau of Statistics (2014), Nepal, Kathmandu.

In addition, the government expects a continuously declining trend of poverty in Nepal. The Nepal Planning Commission (2013) reported that Nepal was likely to meet MDG indicators related to extreme poverty reduction, with the head count ratio targeted to reach 21% by 2015, and there has been a supportive environment for it. The Central Bureau of Statistics (CBS) estimated that the absolute-poverty head count ratio reached 23.85% in 2013[1].

Given this scenario, this paper aims to address the research question of why absolute poverty has been declining as a trend in Nepal despite the political instability in the past decades. As poverty is a multidimensional phenomenon, multiple factors affect its intensity and trend. This research paper attempts to analyze various economic and non-economic factors that might have contributed to declination of poverty head count ratio over the time in Nepal. For this purpose, poverty influencing multiple variables that have apparently negative or positive trend in Nepal have been chosen and analyzed. Such variables includes, but not limited to gross domestic product (GDP) per capita, personal remittance received, foreign direct investment (FDI), livestock production index, agriculture and service sector share in GDP, electricity power consumption per capita, public expenditure on education sector etc.

Following the introduction section, this paper is organized in three parts; a review of literature, analysis and conclusion. After a brief literature review in poverty, this paper utilizes econometric analysis to find out the variables that have significant impact on the level of poverty as well as an annualized change in the poverty head count ratio. Then estimating equations for the level of poverty and a change in the poverty headcount ratio will be established. After that the estimated equations will be utilized to test the Nepalese case. Finally, the concluding section provides some policy implications based on the findings of this research.

[1] Government of Nepal (2013). *Nepal Millennium Development Goals Progress Report 2013.* Kathmandu. Nepal Planning Commission and United Nations Country Team of Nepal (p.9).

2. Review of Literature

Elimination of absolute poverty, the situation of being unable or only barely able to meet the subsistence essentials of food, clothing, and shelter, is at the core of all development problems and the principal objective of development policy of the world. Though countries with sustained growth have been able to reduce absolute poverty, growth does not guarantee poverty reduction. However, faster growth probably supports poverty reduction by improved incomes, education, and health. With pro-poor policy designed to promote inclusive economic growth and modern sector expansion, economic growth results in lower poverty (Todaro, 2014).

Furthermore, OECD (2012) identifies eight domains of empowerment within three spheres: the economic (markets, decent employment and productive assets); the political (political representation and collective action); and the social (human capabilities, critical awareness and inclusion) which can promote pro-poor development i.e. less absolute poverty.

Whereas ADB (2012) considers infrastructure development as the backbone of economic/overall progress, which in turn raises household incomes and reduces poverty. It emphasizes the availability of transport, electricity, safe water and sanitation, and other key facilities such as schools and hospitals, which has a tremendous impact on improving the quality of life of households, especially poor ones. It also recognizes the right mix and synergy of the soft and hard components of infrastructure for inclusive growth and poverty reduction.

However, many researchers and institution are conducting research to understand the impact of various economic and non-economic variables on absolute poverty reduction. In this scenario, Acosta, Fajnzylber, & Lopez (2007) found that regardless of the counterfactual used remittances appear to lower poverty levels in most recipient countries in Latin America. Anyanwu & Erhijakpor (2010) found that international remittances –as a share of remittances in a country's GDP – reduce the level, depth, and severity of poverty in Africa. Similarly, another study conducted by Lokshin, Bontch, Mikhail and Glinskaya (2007) indicated that one-fifth of poverty reduction in Nepal occurring between 1995 and 2004 could be attributed to higher levels of work-related migration and remittances sent home.

In other case, Jung & Thorbecke (2003) got a result of the simulation experiments that a well-targeted pattern of education expenditure can be effective for poverty alleviation. Likewise,

Neumark and Wascher (2002) found that minimum wages tend to boost the incomes of poor families that remain below the poverty line. And there are also studies on the impact of good governance/bad governance, participation, globalization, and inclusiveness on poverty.

The above brief overview on the poverty-related literature reflects the complexities and vastness of the subject matter. It also indicates current efforts that are being made to understand poverty and its determining factors. However, there seems a lack of research that measures/predicts the level of poverty and a change in poverty on the basis of independent variables.

3. Empirical Evidence: Relationship between absolute poverty trend and its dynamics

3.1. Data

The study considers the variables that have obvious positive or negative trends in Nepal during last decades. Such variables include various indicators available in the World Bank website. The poverty head count ratio at US$ 1.25 and the share of agriculture production to GDP are declining over time. In contrast, GDP per capita, personal remittances, the share of service production to GDP, foreign direct investment (FDI), livestock production relative to GDP, electricity power consumption per capita, and public expenditure on education as a ratio of GDP are trending up.

Based on these variables a new dataset is created for econometric analysis. GDP index is created as base year of 2005 from GDP data. Livestock production index (LSPI) to GDP index is created by utilizing LSPI and GDP data. Likewise, FDI/GDP, personal remittance/GDP are also created by using particular variable and GDP data.

Since poverty head count ratios for a country are not reported every year, annualized changes in particular variables are derived from the original level values. For example, in the case of Nepal, the poverty ratios are reported only for 1996, 2003 and 2010. An annualized change in the poverty ratio can be obtained as the difference between the poverty ratio in 2010 and in 2003 divided by 7, or as the difference between the poverty ratio in 2003 and in 1996 divided by 7. So for Nepal there are three observations for the level of poverty and only two observations for the change in the level of poverty. General formula used for deriving new variables are presented in appendix 1.

Regional dummies are defined using the World Bank's regional classification. Countries under the World Bank classification are enlisted in Appendix 2. The MDG dummy is created on the basis of time when the MDG was formally introduced. The natural disaster dummy is also introduce when a natural disaster caused damage above 0.1% of GDP.

Cross-country unstructured data for aforementioned variables are collected from the World Bank website, and disaster-related data are collected from the Centre for Research on the Epidemiology of Disaster (CRED)'s website (www.emdat.be). Though there are many poverty observations in the World Bank data, the availability of data for all variables limits the number of countries for analysis to 58 at most and the time period of 1984 to 2011. All of the developing countries and their data used for analysis are tabulated in appendix 3.

3.2. Methodology/Statistical Procedure /Model

Two different equations are estimated to explain the poverty head count ratio of the developing world by utilizing cross-country, time-series data. The first equation (Eq.1) which is used for estimating the level of poverty head count ratio is written as:

$$PHR(i,t) = \alpha_0 + \alpha_1*(GDP\_PC(i,t)) + \alpha_2*(Rem\_GDP(i,t)) + \alpha_3*(FDI\_GDP(i,t)) + \alpha_4*(Edu\_GDP(i,t)) + \alpha_5*(Agri\_GDP(i,t)) + \alpha_6*(Service\_GDP(i,t)) + \alpha_7*(LSPI\_GDPI(i,t)) + \alpha_8*(EPC(i,t)) + \alpha_9*(SA\_dummy\ (i,t)) + \alpha_{10}*(EAP\_Dummy(i,t)) + \alpha_{11}*(SSA\_Dummy(i,t)) + \alpha_{12}*(LAC\_Dummy(i,t)) + \alpha_{13}*(MDG\_Dummy(i,t)) + \alpha_{14}*(Dis\_Dummy(i,t)) + \mu(i,t) \quad \ldots\ldots\text{(Eq. 1)}$$

The second equation (Eq.2) which is used for estimate the annualized change in the poverty head count ratio is written as:

$$\Delta PHR(i,t) = \beta_0 + \beta_1*(\Delta GDP\_PC(i,t)) + \beta_2*(\Delta Rem\_GDP(i,t)) + \beta_3*(\Delta FDI\_GDP(i,t)) + \beta_4*(\Delta Edu\_GDP(i,t)) + \beta_5*(\Delta Agri\_GDP(i,t)) + \beta_6*(\Delta Service\_GDP(i,t)) + \beta_7*(\Delta LSPI\_GDPI(i,t)) + \beta_8*(\Delta EPC(i,t)) + \beta_9*(SA\_dummy\ (i,t)) + \beta_{10}*(EAP\_Dummy(i,t)) + \beta_{11}*(SSA\_Dummy(i,t)) + \beta_{12}*(LAC\_Dummy(i,t)) + \beta_{13}*(MDG\_Dummy(i,t)) + \mu(i,t) \quad \ldots\ldots\text{(Eq. 2)}$$

Where,

i = country
t = year
α_0 = fixed effect to the level of poverty headcount ratio/ constant parameter
$\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7, \alpha_8, \alpha_9, \alpha_{10}, \alpha_{11}, \alpha_{12}, \alpha_{13}, \alpha_{14}, \alpha_{15}$ = coefficient for adjacent variables
β_0 = fixed effect to the annualized change in poverty head count ration/ constant parameter
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12}, \beta_{13}, \beta_{14}, \beta_{15}$ = coefficient for adjacent variables
Δ = Annualized change
PHR = Poverty head count ratio
GDP_PC = Gross domestic product per capita
Rem_GDP = Remittances to Gross Domestic Product (GDP) ratio
FDI_GDP = Foreign direct investment (FDI) to GDP ratio
Edu_GDP = Public expenditure on educational to GDP ratio
Agri_GDP = Agriculture sector share to GDP

Service_GDP = Service sector share to GDP
LSPI_GDPI = Livestock production index to gross domestic product index (base year 2005)
EPC = Electricity power consumption in kWh per capita
SA_Dummy = Regional dummy for South Asian countries
EAP_Dummy = Regional dummy for East Asian and Pacific countries
SSA_Dummy = Regional dummy for Sub-Sahara African countries
LAC_Dummy = Regional dummy for Latin America and Caribbean countries
MDG_Dummy = Dummy to reflect existence of Millennium Development Goals
Dis_Dummy = Natural disaster dummy
μ= error term

3.3. Empirical Results and Discussions

Table 2 summarizes the results obtained by the least square estimation of the absolute poverty level (Eq.1) and the annualized change in absolute poverty (Eq.2). More details are presented in appendix 4 and appendix 5.

Table 2: Summary of Empirical Analysis

Absolute poverty level estimation (Eq. 1)			Annualized change in absolute poverty estimation (Eq. 2)		
Variable/Parameter	Coefficient	Prob.	Variable/Parameter	Coefficient	Prob.
α_0	8.241418	0.2036	β_0	0.196099	0.7729
GDP_PC	-0.001322	0.0017***	Δ GDP_PC	0.000533	0.3948
REM_GDP	-0.236517	0.0126**	Δ REM_GDP	-0.291665	0.0585*
FDI_GDP	0.088956	0.5375	Δ FDI_GDP	-0.118268	0.1615
EDU_GDP	-1.484671	0.0003***	Δ EDU_GDP	-0.664903	0.3773
AGRI_GDP	0.528328	0.0000***	Δ AGRI_GDP	0.037069	0.8733
SERVICE_GDP	0.084725	0.2853	Δ SERVICE_GDP	-0.185593	0.2889
LSPI_GDPI	-0.724567	0.6264	Δ LSPI_GDPI	5.347978	0.0266**
EPC	-0.000666	0.4356	Δ EPC	0.001097	0.7031
SA_DUMMY	18.10979	0.0000***	SA_DUMMY	-1.597142	0.1860
EAP_DUMMY	6.498677	0.0045***	EAP_DUMMY	-0.880844	0.3307
SSA_DUMMY	22.13517	0.0000***	SSA_DUMMY	-0.657968	0.5853
LAC_DUMMY	4.024089	0.0368**	LAC_DUMMY	-0.418341	0.4982
MDG_DUMMY	-1.689187	0.2317	MDG_DUMMY	-0.663528	0.2662
DIS_DUMMY	2.735205	0.0370**			
Adjusted R^2	0.620933		Adjusted R^2	0.064717	
Standard Error	9.257285		Standard Error	3.636213	
No. of observations	312		No. of observations	212	
No. of country included	58		No. of country included	47	

* 10% level of statistical significance, ** 5% level of statistical significance, *** 1% level of statistical significance.

Table 2 indicates that there exist three types of relationships between the poverty head count ratio and other variables under consideration; positive, negative and relationship undetermined with current data. The relationships observed in this study are not contradictory to past studies.

3.3.1. Level effects on poverty head count ratio

3.3.1.1 Variables with negative effect to poverty head count ratio

GDP per capita, the remittances to GDP ratio and the public expenditure on education to GDP ratio are found to have negative effect on level of absolute poverty. This study shows that a high level of GDP per capita leads to lower absolute poverty but very slightly. In other words, higher GDP per capita has some trickle-down effect on the poverty head count ratio. However, because of the existence of inequality of wealth distribution in the economy, the poverty head count ratio could not go down as rapidly as the rise of GDP per capita.

Similarly, it is revealed in this study that a high level of the remittances to GDP ratio has a moderate negative effect on the poverty head count ratio. Likewise, public expenditure to education sector as a ratio of GDP strongly affects the level of absolute poverty. An one percentage point increase in public expenditure on education to GDP lead to more than one and half percentage point reduction in the level of poverty head count ratio. A possible reason for this is that education has multiple positive effects on productivity, labor market, and public health.

3.3.1.2. Variables with positive effect to poverty head count ratio

The agricultural sector share to GDP ratio has a positive impact on the poverty head count ratio. This indicator reflects the economic structure of the country, that is, a high agricultural share to GDP means low manufacturing and services activities in the economy. It is observed globally that poverty is high in the agricultural economy than in a manufacturing once because agriculture tends to have lower productivity and vice versa. Moreover, agriculture is the main activity for rural people, which would cause concentration of poverty in rural areas. The results of this study indicate that a country with a high agricultural share in GDP tends to have a high level of poverty.

3.3.1.3. Variables whose effects are undetermined in terms of poverty head count ratio

In this analysis, there is no statistical evidence for some variables to show impact of these variables on the level of poverty head count ratio. Such variables include foreign direct

investment (FDI) to GDP ratio, service sector share to GDP, livestock production index to GDP index, and electric power consumption per capita.

3.3.1.4. Regional, MDGs, Natural Disaster's effect on level of poverty head count ratio

Table 2 also shows that the level of poverty head count ratio varies from one region to another region of the world. The poverty head count ratio for the Sub-Sahara region is the highest. It is about 22% higher than the world poverty head count ratio. Following the Sub-Sahara region, the South Asia region seems to have high poverty ratios; 18% point higher than the world average poverty head count ratio, about 10% point higher than in East Asia and the Pacific, and around 6% higher than in Latin America and the Caribbean.

However, the estimation results do not provide sufficient evidence to support the claim that the adoption of the millennium development goals (MDGs) is effective in reducing the level of poverty in the world's developing countries.

The study shows that countries with natural disasters are more vulnerable to absolute poverty risk. The econometric analysis shows that natural disasters cause more than 2 percentage point rise in the absolute poverty level of the country.

3.3.2. Annualized change effects on poverty head count ratio

3.3.2.1. Variables which have negative effects on annualized changes in PHR

The annualized change in the remittance to GDP ratio is found to have negative effect on the annualized change in the poverty head count ratio. With the confidence level of 10%, an increase in the remittance to GDP ratio by 1 percentage point lowers the poverty head count ratio by about 0.3 percentage point annually.

3.3.2.2. Variables with positive effects on annualized changes in PHR

The empirical results reveal that the annualized change in the ratio of livestock production to GDP has positive impact on the annualized change in the poverty head count ratio. Like the agricultural sector, livestock production tends to be an important economic activity in developing countries whose productivity tends to be low. An increase in the change in livestock production (as a ratio of GDP), therefore, can lead to an increase in the change in absolute poverty. One may note that potentially there could be reverse causality.

3.3.2.3. Variables whose effects on annualized changes in PHR are undetermined

The results do not provide sufficient statistical evidence to establish significant impacts of other variables on the annualized change in the poverty head count ratio. These other variables include: GDP per capita, the FDI to GDP ratio, the ODA to GDP ratio, the public

expenditure on education to GDP ratio, the agricultural share to GDP, the service sector share to GDP and electricity power consumption (EPC) in kWh per capita.

Similarly, there is no sufficient statistical evidence for the impact of regional dummies on the annualized change in the poverty head count ratio. In addition, there is a lack of evidence that the adoption of MDGs has affected the annualized change in the poverty head count ratio.

3.4. Simplified estimation equation

This section provides simplified estimation results by modifying the poverty level estimation, i.e., equation 1. Essentially, we eliminate variables that have shown statistically insignificant coefficients (variables with high prob. value in left side of table 2) from the equation. Such variables are the FDP to GDP ratio, the service sector contribution to GDP ratio, livestock production index to gross domestic production index, and the MDG dummy.

The third equation (Eq.3), a miniature form of equation 1, which can be used for estimating the level of poverty head count ratio for the entire sample is written as:

$$PHR(i,t) = \lambda_0 + \lambda_1*(GDP\_PC(i,t)) + \lambda_2*(Rem\_GDP(i,t)) + \lambda_3*(Edu\_GDP(i,t)) + \lambda_4*(Agri\_GDP(i,t)) + \lambda_5*(SA\_dummy\ (i,t)) + \lambda_6*(EAP\_Dummy(i,t)) + \lambda_7*(SSA\_Dummy(i,t)) + \lambda_8*(LAC\_Dummy(i,t)) + \lambda_9*(Dis\_Dummy(i,t)) + \mu(i,t) \quad \text{(Eq.3)}$$

Where,

- i = country
- t = year
- λ_0 = fixed effect to level of poverty headcount ratio/ constant parameter
- $\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5, \lambda_6, \lambda_7, \lambda_8, \lambda_9$ = coefficient for adjacent variables
- PHR = Poverty head count ratio
- GDP_PC = Gross domestic product per capita
- Rem_GDP = Remittance to Gross Domestic Product (GDP) ratio
- Edu_GDP = Public expenditure on educational sector to GDP ratio
- Agri_GDP = Agriculture sector share to GDP
- SA_Dummy = Regional dummy for South Asian countries
- EAP_Dummy = Regional dummy for East Asian and Pacific countries
- SSA_Dummy = Regional dummy for Sub-Sahara African countries
- LAC_Dummy = Regional dummy for Latin America and Caribbean countries
- Dis_Dummy = Natural disaster dummy
- μ= error term

Table 3: Summary of simplified absolute poverty level estimation (Eq.3)

Variable/Parameter	Coefficient	Prob.
λ_0	9.882506	0.0007*
GDP_PC	-0.001464	0.0000*
REM_GDP	-0.212006	0.0121**

EDU_GDP	-1.399404	0.0003*
AGRI_GDP	0.494536	0.0000*
SA_DUMMY	19.44642	0.0000*
EAP_DUMMY	6.946508	0.0005*
SSA_DUMMY	22.86515	0.0000*
LAC_DUMMY	5.402026	0.0002*
DIS_DUMMY	2.748353	0.0338**
Adjusted R^2	0.622056	
Standard Error	9.243565	
No. of observations	312	
No. of country included	58	

* 1% level of statistical significance, ** 5% level of statistical significance

Table 3 summarizes the results obtained by the least square estimation of absolute poverty level (Eq.3) after eliminating statistically insignificant coefficients. More details are presented in appendix-6. It points toward a negative relation between poverty and key economic variables. GDP per capita, remittances, and public expenditure on education have negative and statistically significant impact on the poverty head count ratio. In contrast, the agricultural sector contribution to GDP has positive and statistically significant impact on poverty. This suggests that the higher the dependency on agricultural activities more people live under absolute poverty.

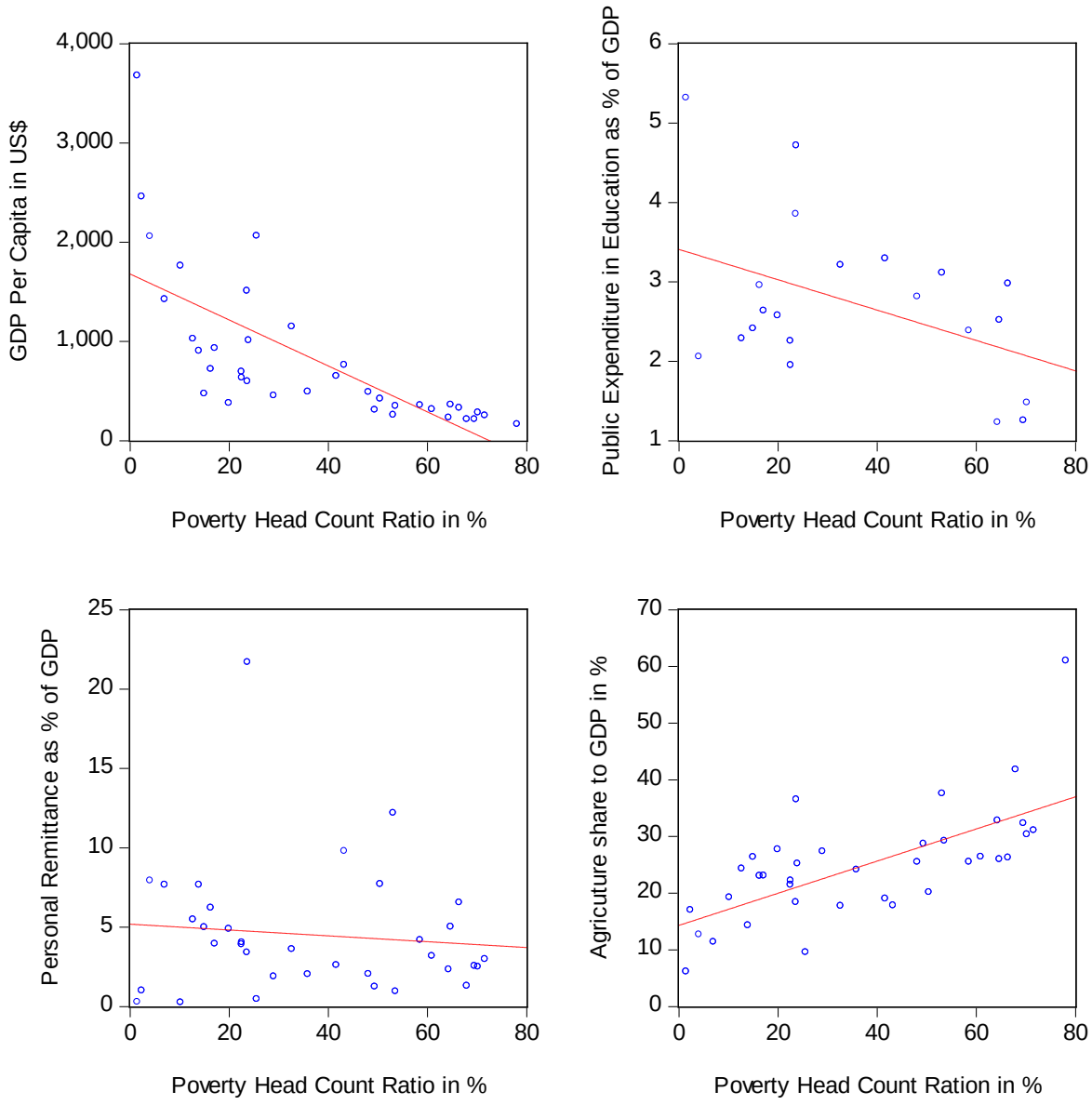
Table 3 also shows estimated level of poverty head count ratio for the world and different region of the world. It indicate at least 9% people of the developing countries are absolutely poor. The poverty head count ratio for the Sub-Sahara region is the highest. It is about 22% higher than the world poverty head count ratio. Following the Sub-Sahara region, the South Asia region seems to have high poverty ratios; 19% point higher than the world average poverty head count ratio. In contrast, it is about 7% and 5.4% for East Asian and the Pacific countries and Latin America and the Caribbean countries respectively. And, in case the country tends to suffer from natural disaster, the poverty level rises nearly by 2.7%.

3.5 Graphical presentation from the South Asia region

The reported relationship between the poverty head count ratio and its determining variables (GDP per capita, personal remittances to GDP, public expenditure on education to GDP, and the agricultural share to GDP) is supported by the scatter diagrams drawn using data for South Asian countries presented in appendix-7. In Figure 3, the regression lines clearly depict an inverse relationship between the poverty head count ratio and GDP per

capita, the personal remittance to GDP ratio and the public expenditure on education to GDP ratio. On the other hand, it shows a positive relationship between the agricultural share to GDP and the poverty head count ratio.

Figure 3: Graphical presentation using data from South Asia



4. A case of Nepal

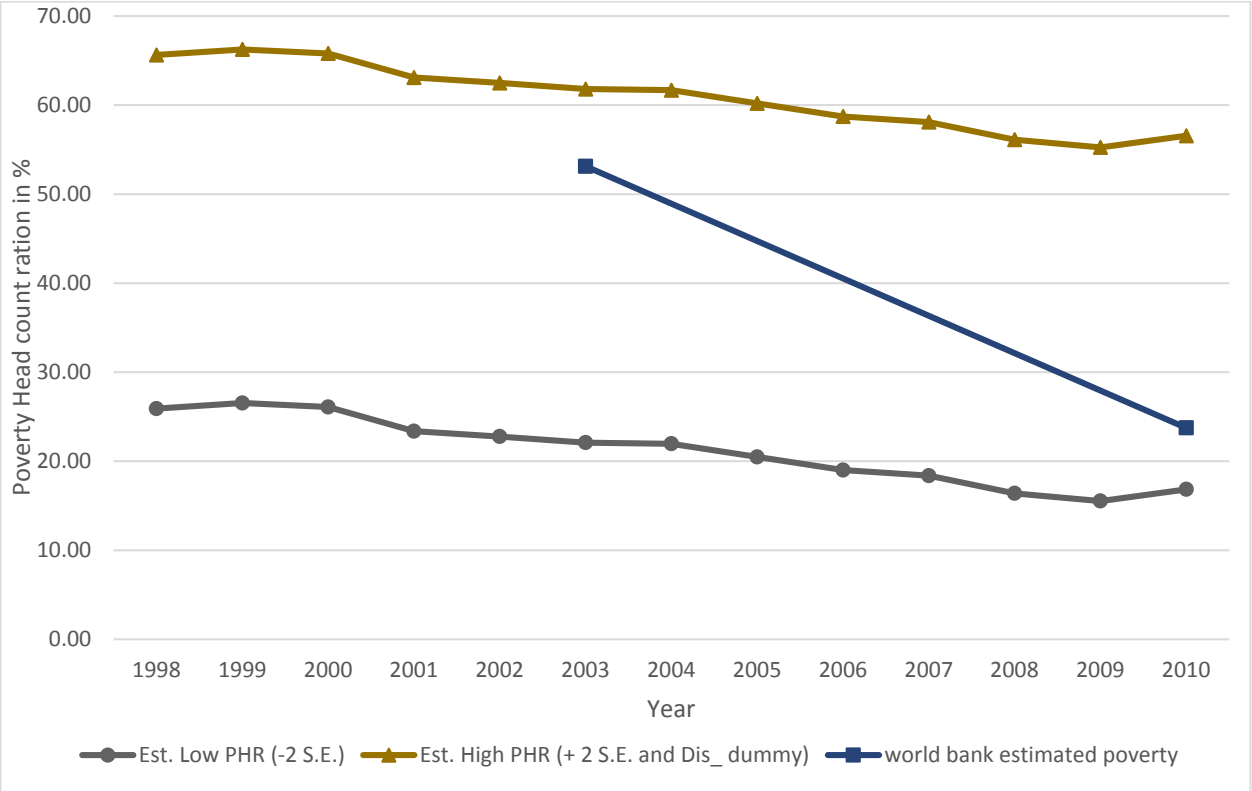
4.1. Estimation of the level of absolute poverty in Nepal

The econometric results for equation 3 allow us to estimate the level of absolute poverty in Nepal for the years when official estimates are not available. Using the estimated coefficients and the actual values of GDP per capita, personal remittances to GDP ratio, public expenditure to GDP ratio and agriculture share to GDP ratio, the poverty head count of Nepal during the period 1998 to 2010 (sufficient data are available only for this period)

is estimated. Figure 4 summaries the result of estimation for Nepal under two scenarios. Details of calculation are shown in appendix-8.

Since Nepal is vulnerable to natural disasters and each year faces human and non-human losses due to disasters, the high value scenario includes natural disaster values in addition to two standard error. In contrast, the low value scenario is based on the fitted estimation less two standard error. Figure 4 summaries the trend of estimated values of high and low levels of poverty for Nepal. It is clear from the figure that the World Bank poverty head count ratio estimation lies in between the high and low values calculated using equation 3. It also validates analysis performed so far.

Figure 4: Estimated poverty vs. World Bank PHR observation

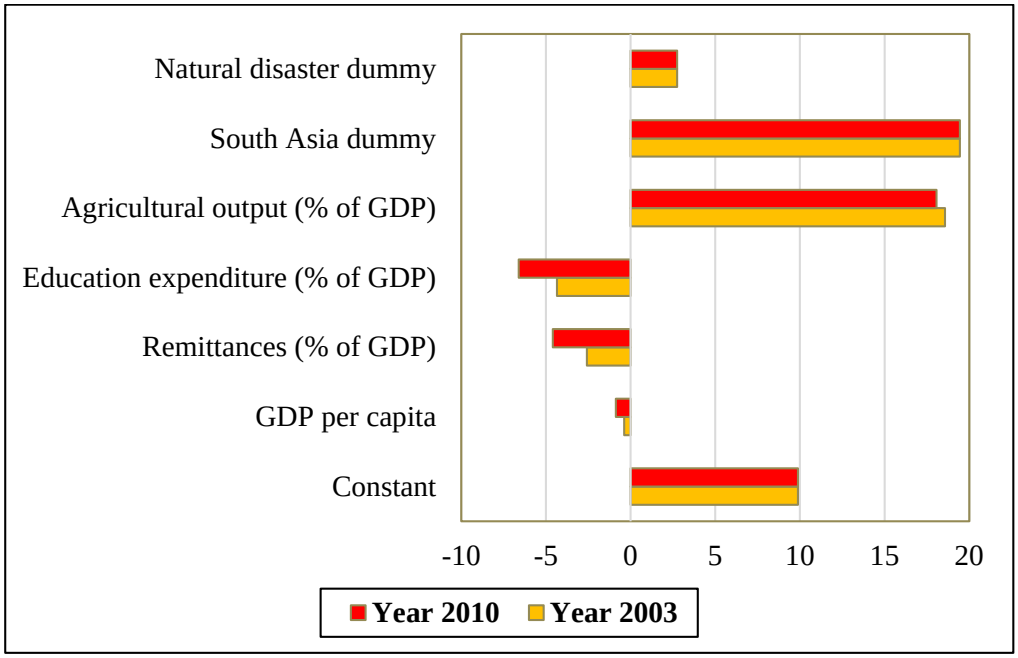


4.2. Key contributors that set declining trend of absolute poverty in Nepal

Figure 5 depicts the key determinants of the levels of absolute poverty in Nepal for 2003 and 2010 and identifies the major contributors to the declining trend of poverty in Nepal. The calculation in the figure is based on the estimation results of equation 3 and the actual Nepalese data. The poverty ratio in Nepal declined by 29.4% during year 2003 to 2010. Since the coefficient for public expenditure on education is strongly negative and the actual change in expenditure on education was positive in Nepal, it was the major contributor to

poverty reduction in Nepal causing the poverty ratio to decline by 2.3% points between 2003 and 2010. Personal remittances received as a ratio of GDP are found to be the second major contributor that induced a decline in poverty by 2.0% points between the two years. It is also observed that the economic structural change (Agri_GDP) and economic growth (GDP per capita) contributed to poverty reduction in Nepal by 0.5% point each.

Figure 5: Analysis of major contributors to poverty reduction in Nepal



5. Conclusion and policy implication

Despite the continuous political turmoil in Nepal, the level of absolute poverty has been declining over a few decades. In this context, the current study is carried out with an aim to understand the possible variables that have contributed to a trend decline in absolute poverty in Nepal. Multiple relevant variables, which have obvious trends during the last decades in Nepal, are selected for multiple regression analysis. It reveals that GDP per capita, personal remittances, public expenditure to education sector and economic structure of country (indicated by agriculture share to GDP) are reliable predictors for the poverty head count ratio.

After finding the predictors of absolute poverty, the relationship is depicted with graphical presentation generated by South Asian data. The econometric results clearly support the previously found relationship between the poverty headcount ratio and other key economic variables. Then, the poverty headcount ratio for Nepal is estimated using the simplified

regression estimation equation. The World Bank's poverty data of Nepal are found to be contained within the range of estimated high and low values. Moreover, public expenditure on education and personal remittances received are found to be major contributors to poverty reduction in Nepal. Nonetheless, these factors explain only part of the large decline in the poverty reduction between 2003 and 2010 (29.4%), which has yet to be fully explained in future research.

So, it can be concluded that economic growth, income from foreign employment, a rise in the education level and a change in economic structure in Nepal which are reflected by increased GDP per capita, rising personal remittance to GDP, increasing public expenditure on education sector and a declining agricultural share to GDP have all played significant roles for reducing absolute poverty in Nepal. The role of education and income through foreign employment is found very high compared to other determinants. This finding may provide public policy makers with some useful, practical implications, especially for designing and implementing poverty alleviation policy, programs and projects in developing countries.

Since the study is limited to indicators published by the World Bank, it is mainly focused on a few economic factors. However, there are other variables as well that may significantly influence the level of poverty head count ratio but they are omitted in this study. Such variables include governance effectiveness, political system, extent of social inclusion, gender equality, availability of micro-finance etc. Another limitation of the study is that countries and observation data are randomly selected. Because of gaps of data availability, the number of observations is limited to 312 while the number of countries included is only 58. While some countries have many observations, other countries have only one observation. Future research should therefore concentrate on including other relevant variables with consideration to time lag effects, increasing the sample size and balancing the number of observations among countries.

References

Acosta, P. A., Fajnzylber, P., & Lopez, H. (2007). The impact of remittances on poverty and human capital: evidence from Latin American household surveys. *World Bank Policy Research Working Paper*, (4247).

Anyanwu, J. C., & Erhijakpor, A. E. (2010). Do International Remittances Affect Poverty in Africa?*. *African Development Review*, *22*(1), 51-91.

Central Bureau of Statistics (2014). *Nepal in figures 2013*. Kathmandu.

Cervantes-Godoy, D., & Dewbre, J. (2010). Economic importance of agriculture for poverty reduction.

DFID (2013). *Regional Dimensions of Poverty and Vulnerability in Nepal*. Discussion Paper.

Donaldson, J. A. (2008). Growth is good for whom, when, how?: Economic growth and poverty reduction in exceptional cases. World Development, 36(11), 2127-2143. doi:10.1016/j.worlddev.2007.10.020

El-Komi, MS (2010) Poverty:. Alleviation through microfinance and implications on education

GoN and UNDP (2014). *Nepal Human Development Report: Beyond Geography Unlocking Human Potential*. Kathmandu. GoN and UNDP.

Government of Nepal (2011). *Nepal Living Standard Survey*. CBS. Kathmandu.

Government of Nepal (2013). *Nepal Millennium Development Goals Progress Report 2013.* Kathmandu. Nepal Planning Commission and United Nations Country Team of Nepal (p.9).

Government of Nepal (2013). *Small Area Estimates of Poverty, 2011.* Kathmandu. CBS.

http://sapkotac.blogspot.jp/2011/08/major-findings-of-nepal-living-standard.html

http://www.emdat.be/advanced_search/index.html

Jung, H. S., & Thorbecke, E. (2003). The impact of public education expenditure on human capital, growth, and poverty in Tanzania and Zambia: a general equilibrium approach. *Journal of Policy Modeling*, *25*(8), 701-725.

Lokshin, Michael; Bontch-Osmolovski, Mikhail; Glinskaya, Elena. 2007. *Work-Related Migration and Poverty Reduction in Nepal.* World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/7123 License: CC BY 3.0 Unported.

Morrisson, C., & Organisation for Economic Co-operation and Development. Development Centre. (2002). Education and health expenditure and poverty reduction in east africa: Madagascar and tanzania. Paris: Development Centre of the Organisation for Economic Co-operation and Development. doi:10.1787/9789264177499-en

Neumark, D. and Wascher, W. (2002), Do Minimum Wages Fight Poverty?. *Economic Inquiry*, 40: 315–333. doi: 10.1093/ei/40.3.315

NPC & UN (2013). *Nepal Millennium Development Goals Progress Report 2013.* Kathmandu.

OECD (2012), *Poverty Reduction and Pro-Poor Growth: The Role of Empowerment*, OECD Publishing, Paris.
DOI: http://dx.doi.org/10.1787/9789264168350-en

Organisation for Economic Co-operation and Development, & Brooks, J. (2012). Agricultural policies for poverty reduction. Paris: OECD.

Organisation for Economic Co-operation and Development, & OECD (2001) Poverty reduction Paris:.... Organisation for Economic Co-operation and Development doi: 10.1787 / 9789264194779-en

Pritchard, B., Rammohan, A., Sekher, M., Parasuraman, S., & Choithani, C. (2013). *To Feed India, to Feed the World: Livelihoods, Entitlements and Capabilities*. Routledge.

Tebaldi, E., & Mohan, R. (2010) Institutions and poverty The Journal of Development Studies, 46 (6), 1047-1066 doi:... 10.1080 / 00220380903012730

The World Bank Group (2014). *World Bank Group Strategy October 2013*. Washington DC. The World Bank Group.

Todaro, M. P., & Smith, S. C. (2009). *Economic development* (10th ed.). Harlow: Addison-Wesley.

Appendix -1

Formula used for deriving new variables and data

1. $Rem\_GDP = \frac{Remittance(i,t)}{GDP} * 100$
2. $ODA\_GDP = \frac{ODA(i,t)}{GDP} * 100$
3. $FDI\_GDP = \frac{FDI(i,t)}{GDP} * 100$
4. $GDPI = \frac{GDPI(i,t)}{GDP(i,2005)} * 100$
5. $LSPI\_GDPI = \frac{LSPI(i,t)}{GDPI(i,t)}$
6. $\Delta PHR = \frac{PHR(i,t) - PHR(i,t-k)}{k}$
7. $\Delta GDP\_PC = \frac{GDP\_PC(i,t) - GDP\_PC(i,t-k)}{k}$
8. $\Delta ODA\_GDP = \frac{ODA\_GDP(i,t) - ODA\_GDP(i,t-k)}{k}$
9. $\Delta FDI\_GDP = \frac{FDI\_GDP(i,t) - FDI\_GDP(i,t-k)}{k}$
10. $\Delta Agri\_GDP = \frac{Agri\_GDP(i,t) - Agri\_GDP(i,t-k)}{k}$
11. $\Delta Service\_GDP = \frac{Service\_GDP(i,t) - Service\_GDP(i,t-k)}{k}$
12. $\Delta LSPI\_GDPI = \frac{LSPI\_GDPI(i,t) - LSPI\_GDPI(i,t-k)}{k}$
13. $\Delta Edu\_GDP = \frac{Edu\_GDP(i,t) - Edu\_GDP(i,t-k)}{k}$
14. $\Delta EPC = \frac{EPC(i,t) - EPC(i,t-k)}{k}$

Where,

i = Country

t = Year of observation

k = interval between two nearest poverty observation

Δ = Annual change

Rem_GDP is Personal Remittance received as percentage of GDP

ODA_GDP is ODA received as percentage of GDP

FDI_GDP is Foreign direct investment (FDI) received as percentage of GDP

Agri_GDP is Share of Agriculture sector as percentage of GDP

Service_GDP is Share of Service sector as percentage of GDP

EDU_GDP is public expenditure on educational sector as percentage of GDP

GDPI is Gross domestic index as of base year 2005

LSPI_GDPI is ratio of Livestock production index (LSPI) to GDPI

GDP_PC is Gross domestic product (GDP) per capita

EPC is Electricity power consumption in kWh per capita

Appendix – 2

List of regional developing countries according to the World Bank classification

S.No.	Region					
	Sub-Sahara Africa	Latin America and Carrebian	Middle East and North Africa	Europe and Central Asia	East-Asia Pacific	South Asia
1	Angola	Argentina	Algeria	Albania	American Samoa	Afghanistan
2	Benin	Belize	Djibouti	Armenia	Cambodia	Bangladesh
3	Botswana	Bolivia	Egypt, Arab Rep.	Azerbaijan	China	Bhutan
4	Burkina Faso	Brazil	Iran, Islamic Rep.	Belarus	Fiji	India
5	Burundi	Colombia	Iraq	Bosnia and Herzegovina	Indonesia	Maldives
6	Cameroon	Costa Rica	Jordan	Bulgaria	Kiribati	Nepal
7	Cabo Verde	Cuba	Lebanon	Georgia	Korea, Dem. Rep.	Pakistan
8	Central African Republic	Dominica	Libya	Kazakhstan	Lao PDR	Sri Lanka
9	Chad	Dominican Republic	Morocco	Kosovo	Malaysia	
10	Comoros	Ecuador	Syrian Arab Republic	Kyrgyz Republic	Marshall Islands	
11	Congo, Dem. Rep.	El Salvador	Tunisia	Macedonia, FYR	Micronesia, Fed. Sts.	
12	Congo, Rep	Grenada	West Bank and Gaza	Moldova	Mongolia	
13	Côte d'Ivoire	Guatemala	Yemen, Rep.	Montenegro	Myanmar	
14	Eritrea	Guyana		Romania	Palau	
15	Ethiopia	Haiti		Serbia	Papua New Guinea	
16	Gabon	Honduras		Tajikistan	Philippines	
17	Gambia, The	Jamaica		Turkey	Samoa	
18	Ghana	Mexico		Turkmenistan	Solomon Islands	
19	Guinea	Nicaragua		Ukraine	Thailand	
20	Guinea-Bissau	Panama		Uzbekistan	Timor-Leste	
21	Kenya	Paraguay			Tonga	
22	Lesotho	Peru			Tuvalu	
23	Liberia	St. Lucia			Vanuatu	
24	Madagascar	St. Vincent and the Grenadines			Vietnam	
25	Malawi	Suriname				
26	Mali	Venezuela, RB				
27	Mauritania					
29	Mauritius					
30	Mozambique					
31	Namibia					
32	Niger					
33	Nigeria					
34	Rwanda					
35	São Tomé and Principe					
36	Senegal					
37	Seychelles					
38	Sierra Leone					
39	Somalia					
40	South Africa					
41	South Sudan					
42	Sudan					
43	Swaziland					
44	Tanzania					
45	Togo					
46	Uganda					
47	Zambia					
48	Zimbabwe					

Source: http://data.worldbank.org/about/country-and-lending-groups

Appendix – 3

Appendix -3 is presented in a different file

Appendix – 4

Eview summary on impact of various variables on the level of poverty head count ratio.

Dependent Variable: PHR
Method: Least Squares
Date: 05/12/15 Time: 11:15
Sample: 1 312
Included observations: 312

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.241418	6.468346	1.274115	0.2036
GDP_PC	-0.001322	0.000417	-3.171655	0.0017
REM_GDP	-0.236517	0.094199	-2.510816	0.0126
FDI_GDP	0.088956	0.144116	0.617250	0.5375
EDU_GDP	-1.484671	0.406225	-3.654798	0.0003
AGRI_GDP	0.528328	0.103073	5.125775	0.0000
SERVICE_GDP	0.084725	0.079152	1.070412	0.2853
LSPI_GDPI	-0.724567	1.486703	-0.487365	0.6264
EPC_PC	-0.000666	0.000853	-0.780737	0.4356
SA_DUMMY	18.10979	2.770802	6.535937	0.0000
EAP_DUMMY	6.498677	2.272826	2.859293	0.0045
SSA_DUMMY	22.13517	2.393243	9.249028	0.0000
LAC_DUMMY	4.024089	1.918262	2.097778	0.0368
MDG_DUMMY	-1.689187	1.409580	-1.198362	0.2317
DIS_DUMMY	2.735205	1.305371	2.095346	0.0370

R-squared	0.637997	Mean dependent var	13.29157
Adjusted R-squared	0.620933	S.D. dependent var	15.03576
S.E. of regression	9.257285	Akaike info criterion	7.335582
Sum squared resid	25452.11	Schwarz criterion	7.515534
Log likelihood	-1129.351	Hannan-Quinn criter.	7.407503
F-statistic	37.38820	Durbin-Watson stat	1.130458
Prob(F-statistic)	0.000000		

Appendix – 5

Eview summary on impact of various variables on the annual change of poverty head count ratio.

Dependent Variable: PHR_O
Method: Least Squares
Date: 05/12/15 Time: 11:24
Sample: 1 212
Included observations: 212

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.196099	0.678509	0.289015	0.7729
Δ GDP_PC	0.000533	0.000625	0.852809	0.3948
Δ REM_GDP	-0.291665	0.153253	-1.903159	0.0585
Δ FDI_GDP	-0.118268	0.084153	-1.405396	0.1615
Δ EDU_GDP	-0.664903	0.751478	-0.884793	0.3773
Δ AGRI_GDP	0.037069	0.232179	0.159657	0.8733
Δ SERVICE_GDP	-0.185593	0.174533	-1.063370	0.2889
Δ LSPI_GDPI	5.347978	2.394470	2.233470	0.0266
Δ EPC_PC	0.001097	0.002873	0.381717	0.7031
SA_DUMMY	-1.597142	1.203348	-1.327249	0.1860
EAP_DUMMY	-0.880844	0.903376	-0.975058	0.3307
SSA_DUMMY	-0.657968	1.203931	-0.546516	0.5853
LAC_DUMMY	-0.418341	0.616530	-0.678540	0.4982
MDG_DUMMY	-0.663528	0.595132	-1.114925	0.2662

R-squared	0.122341	Mean dependent var	-1.167818
Adjusted R-squared	0.064717	S.D. dependent var	3.759913
S.E. of regression	3.636213	Akaike info criterion	5.483519
Sum squared resid	2617.965	Schwarz criterion	5.705180
Log likelihood	-567.2530	Hannan-Quinn criter.	5.573109
F-statistic	2.123083	Durbin-Watson stat	2.017013
Prob(F-statistic)	0.014356		

Appendix-6

Eview summary on Equation 3 output

Dependent Variable: PHR
Method: Least Squares
Date: 05/19/15 Time: 22:01
Sample: 1 312
Included observations: 312

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.882506	2.873833	3.438789	0.0007
GDP_PC	-0.001464	0.000322	-4.549976	0.0000
REM_GDP	-0.212006	0.084013	-2.523494	0.0121
EDU_GDP	-1.399404	0.379246	-3.689967	0.0003
AGRI_GDP	0.494536	0.084314	5.865433	0.0000
SA_DUMMY	19.44642	2.444129	7.956380	0.0000
EAP_DUMMY	6.946508	1.967989	3.529750	0.0005
SSA_DUMMY	22.86515	2.252327	10.15179	0.0000
LAC_DUMMY	5.402026	1.455466	3.711545	0.0002
DIS_DUMMY	2.748353	1.288776	2.132529	0.0338

R-squared	0.632993	Mean dependent var	13.29157
Adjusted R-squared	0.622056	S.D. dependent var	15.03576
S.E. of regression	9.243565	Akaike info criterion	7.317259
Sum squared resid	25803.94	Schwarz criterion	7.437227
Log likelihood	-1131.492	Hannan-Quinn criter.	7.365206
F-statistic	57.87469	Durbin-Watson stat	1.122699
Prob(F-statistic)	0.000000		

Appendix-7

South Asian data on poverty head count ratio and other variables

Year	Country	PHR	GDP Per Capita	Personal Remittance to GDPRem_GDP	Agriculture share to GDP	Public expenditure on Education to GDP
1984	Bangladesh	69.55	214.2618275	2.54572094	32.29348801	1.253229976
1985	Bangladesh	64.35	229.2263543	2.324832321	32.76831115	1.227669954
1988	Bangladesh	71.61	251.0324273	2.978390717	31.05157408	
1991	Bangladesh	70.22	281.5987649	2.485236519	30.3652012	1.477239966
1995	Bangladesh	60.91	316.5085869	3.167296077	26.38431849	
2000	Bangladesh	58.59	355.9734341	4.17513405	25.51408614	2.384419918
2005	Bangladesh	50.47	421.1233114	7.701680706	20.14203289	
2010	Bangladesh	43.25	762.8037395	9.786415941	17.81049791	
2003	Bhutan	23.96	1009.155197		25.18818182	
2007	Bhutan	10.22	1760.602629	0.245218583	19.23212392	
2012	Bhutan	2.38	2458.395828	0.994944834	16.97730249	
1987	India	53.59	347.809584	0.938767542	29.1824395	
1993	India	49.4	308.5347869	1.239572826	28.67697144	
2004	India	41.64	649.7106479	2.598496525	19.02855235	3.294759989
2009	India	32.68	1147.238685	3.603698947	17.73663649	3.210760117
2011	India	23.63	1509.238884	3.391129274	18.37071014	3.853090048
1998	Maldives	25.59	2061.649102	0.453622732	9.54817464	
2004	Maldives	1.48	3677.220875	0.269624168	6.131505938	5.316989899
1984	Nepal	78.15	163.5953534		60.99340852	
1995	Nepal	67.97	213.7791254	1.29110016	41.75849381	
2003	Nepal	53.13	258.1178555	12.18031773	37.53912996	3.11435008
2010	Nepal	23.74	595.7716261	21.68849013	36.52847708	4.716989994
1987	Pakistan	66.46	329.306304	6.538015844	26.24987555	2.977459908
1990	Pakistan	64.71	360.1594114	5.014360479	25.97877804	2.51680994
1996	Pakistan	48.14	486.7648298	2.027869305	25.48283815	2.810570002
1998	Pakistan	29.05	453.4948067	1.88448809	27.31006367	
2001	Pakistan	35.87	492.3816981	2.020474727	24.09488168	
2004	Pakistan	22.59	631.4978143	4.026423701	22.18350653	1.948410034
2005	Pakistan	22.58	693.1766897	3.90860075	21.46540471	2.254359961
2007	Pakistan	17.15	929.5874437	3.936064446	23.0582756	2.635270119
2010	Pakistan	12.74	1023.195756	5.469457999	24.29211203	2.286870003
1985	Sri Lanka	19.96	377.3804426	4.878383476	27.68926889	2.576139927
1990	Sri Lanka	15.01	472.0864633	4.989396385	26.31935695	2.410929918
1995	Sri Lanka	16.32	718.4438443	6.208499204	23.01049482	2.957600117
2002	Sri Lanka	13.95	903.8964049	7.654263846	14.27932253	
2006	Sri Lanka	7.04	1423.477215	7.665258184	11.33628023	
2009	Sri Lanka	4.11	2057.113672	7.931686828	12.6919713	2.055900097

Appendix-8

Table of values of PHR estimation to Nepal

Year	Gdp_PC	Rem _GDP	Edu_ GDP	Agri_ GDP	SA_Du mmy	Disaster Dummy	Est. PHR for Nepal	Est. with + 2 S.E.	Est. Low PHR (- 2 S.E.)	Est. High PHR (+ 2 S.E. and Dis_ dummy)	world bank estimated poverty
1998	218.99	1.39	2.89	39.91	19.45	2.75	44.40	62.89	25.91	65.64	
1999	221.84	1.66	2.89	41.29	19.45	2.75	45.02	63.51	26.54	66.26	
2000	236.98	2.03	2.98	40.82	19.45	2.75	44.58	63.06	26.09	65.81	
2001	253.94	2.45	3.71	37.64	19.45	2.75	41.86	60.35	23.38	63.10	
2002	251.04	11.21	3.15	38.59	19.45	2.75	41.26	59.74	22.77	62.49	
2003	258.12	12.18	3.11	37.54	19.45	2.75	40.57	59.06	22.09	61.81	53.13
2004	291.87	11.31	3.17	37.17	19.45	2.75	40.45	58.94	21.96	61.68	
2005	321.46	14.91	3.36	36.35	19.45	2.75	38.97	57.45	20.48	60.20	
2006	352.80	16.07	3.61	34.64	19.45	2.75	37.49	55.98	19.00	58.73	
2007	397.90	16.79	3.52	33.56	19.45	2.75	36.86	55.35	18.37	58.10	
2008	477.93	21.74	3.81	32.73	19.45	2.75	34.88	53.37	16.39	56.12	
2009	485.96	23.14	4.66	34.03	19.45	2.75	34.02	52.50	15.53	55.25	
2010	595.77	21.69	4.72	36.53	19.45	2.75	35.32	53.81	16.84	56.56	23.74

Estimated PHR for Nepal = 9.882506 -0.001464*GDP Per Capita -0.212006*Personal Rem. to GDP -1.399404*Public exp. On edu. + 0.494536*Agri. Share to GDP+SA Dummy+ Disaster Dummy+/- Standard Error (based on equation 3)

Disaster Dummy = 2.748353

Standard Error = 9.243565