Trade Liberalization and Poverty relationship: An Evidence from Middle and Low Income Developing Countries

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Abstract: The paper explore the relationship between trade liberalization and poverty in a sample of 107 low income developing countries by applying correlation and regression analysis technique on the data from 1980-2010. Our investigation established the fact that the relationship of trade liberalization and poverty in sample of low income developing countries is different across the different income groups. Correlation analysis reveals that Openness and Poverty has significant relationship in the low income developing countries, while this relationship is insignificant in the sample of lower middle income and upper middle income countries. It leads us to the conclusion that this relationship varies across different income groups. Further regression analysis established that the role of openness is partially significant in poverty reduction in our sample. But these results differ according to the income groups of sample. Only upper middle income countries are more benefitted from this trade openness while in rest of two income groups openness has no role in poverty reduction.

Key words: Trade liberalization; Poverty; Income level; Developing countries.

1. Introduction

Openness to trade has long been considered as an important element of sound economic policy and trade liberalization has been used as an important tool to execute this goal. Trade liberalization has been an important part of current global campaign and also mainstream policy advice during the 20th century. Multilateral negotiations to reduce the trade barriers originated drastic increase in world trade during the last fifty years. Still there are high barriers on trade in the world. In the developing and developed world there are restrictions on international mobility of labour and related services, agriculture markets are still under protection policies (McCulloch, 2001).

The relationship of trade liberalization and poverty reduction had been under question for long time and still under comprehensive analytical discussions. Open trade policies significantly add up to development as most of the economists agree on the argument that open economies grow faster than the closed economies in the long run (Dollar and Kraay, 2002). But there is a debate on the issue of short run effects of the open policies. It is argued that trade liberalization would benefit the poor. Winters et al (2004) after making comprehensive survey of literature found that there are no direct studies available in literature on direct linkage of the poverty effects of trade and trade liberalization. Similarly Goldberg and Pavcnik (2004, 2006) made analogous conclusion on the basis of available literature review. There are arguments that trade liberalization policies may have negative impacts on poor people. In the developing economies, the main feature of the poor is that the majority of them are self employed and they are mainly linked with the agriculture (Farm Households). They are linked with the production of goods

or services. They sell their products and earn profits and on the other hand they are net buyers also. Any increase in the price of labour, goods or services, that they are providing, will increase their real income and they would be benefited and vice versa. As trade open economies and it is evident that the markets in developing countries are more vulnerable than developed countries markets. Any change in the trade policy will directly impact the poor and they will be affected.

The researchers in recent years focused their attention to quantify the impact of trade on poverty (Hertel and Reimer 2005). According to the World Bank (2006a) that there is global decrease in poverty rate since 80's. Most of the researchers argue that growth is the main reason behind this decline, with income distribution has no specific roll to play (Dollar and Kraay, 2002). However significant literature is available regarding the roll of income distribution in poverty reduction (e.g. Burno e al 1998, World Bank 2006b, Ravallion, 2009). Among others, in country level analysis, Datt and Ravallion (1992) and Khakwani (1993) has focused on the relationship of poverty with income and inequality. They found substantial contribution by these distributional factors along with growth. Similar findings for cross-country Africa data are estimated by Ali and Thorbecke (2000) with little modification that poverty is more sensitive to income inequality than it is to level of income. Negative relationship between freedom of trade and growth found by Carlsson and Lundstrom(2001). This result is important findings that highlight the importance of the issues in measuring the trade policy which also include the non tariff barriers. McCulloch (2005) conclude that it is difficult to establish the direction of relationship between trade liberalization and growth. Several studies focus on to

estimate the effects of trade policy on poverty through employment and conclude that it is difficult to establish a definite relationship (Khan 2001). In another study Islam (2004) focuses on the growth poverty relationship. They conclude that though growth is necessary for poverty reduction but it is not a sufficient condition.

There are studies that focus on the trade and poverty link through distributional angle. They argue that trade fluctuations can bring change in the demographics of poverty. As the poor households in developing countries are mostly self employed in agriculture sector and the trade share of agriculture is minimum or negligible in the developing countries. The open trade policies may affect the poor household adversely through the increase in certain commodity price if those trade policies are not increasing the trade share of agriculture goods. So there is an important question that in low and middle income countries how the trade openness playing its roll. (Winters et al, 2004).

In this paper the main focus is to explore relationship between trade openness and poverty that how trade liberalization affects the poor in developing economies with different income levels. We will focus our study only on lower income countries. Sampling is done by using the World Bank criterion to distribute the countries in different income level (Lower income, Lower middle Income and Upper Middle Income).

2. Descriptive analysis

The following table shows the descriptive statistics of the variables. Table 1 provides information as overall sample and also as division of sample according to the income level (Lower income, Lower middle Income and Upper Middle Income) as described by the World Bank. The table 1 shows that mean statistics for poverty gap at $1.25 are 8.91 with standard deviation of 10.67. The statistics shows that there is much difference in poverty gap across the three groups. The mean value of poverty gap is higher than the overall average of 8.91 for Lower income countries, while there is big gap between Lower income and lower middle income countries as the same value for lower middle income countries is 3.55. Similar upshot for the Poverty gap at $2 a day, with much wider difference is found. Table 1 also indicates that there is big variation in the poverty gap statistics at poverty gap at $2 a day statistics in lower income developing countries. The value of standard deviation is much higher than the lower middle income and upper middle income countries. As far as poverty head count ratio is concerned, the statistics reveals that there is huge gap within the group of middle and lower income countries. The value of Poverty head count ratio at $1.25 a day for lower income countries is found to be 39.36 against the mean value of 23.79. The mean value of poverty head count ratio at $1.25 a day for upper middle income is 1.92, which is much less as compare to lower income countries. Almost similar differences are found in case of poverty head count ratio at $2 a day statistics. There is comparatively less variation is found in the poverty head count ratio at $1.25 and $2 a day.

Table 1:Descriptive statistics for sample of developing countries

Variables	All income groups		Lower Income (N=55)		Lower Middle Income (N=38)		Upper Middle Income (N=14)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Poverty gap at $1.25 a day	8.91	10.67	14.98	11.34	3.55	5.54	0.61	.87
Poverty gap at $2 a day	31.11	141.33	55.32	195.70	7.64	8.77	1.78	2.12
Poverty headcount ratio at $1.25 a day (Pov1)	23.79	23.69	39.36	22.14	9.91	12.39	1.92	2.66
Poverty headcount ratio at $2 a day (Pov2)	39.72	30.25	62.12	23.07	21.13	17.22	5.89	6.28
Trade Openness (Openness)	-1.45	0.68	-1.65	0.69	-1.28	0.58	-1.1088	0.69
GDP per capita,	3850.36	3315.61	2253.40	241.46	4639.82	2735.19	7309.94	4697.62
Human Development Index (HDI)	0.81	0.95	0.68	0.75	0.91	1.03	0.98	1.34
Secondary School Enrolment (SSE)	1.69	0.24	1.63	0.26	1.77	0.15	1.72	.29

The descriptive analysis also indicate that the low income developing countries are less open as compare to middle income and upper middle income countries. The variation in trade openness is almost similar in all these sub groups.

The descriptive statistics for GDP per capita indicates average difference of around US$5156 between the low income countries and upper middle income countries. There is huge variation in the GDP per capita in upper middle income countries. There is very less variation is found in case of low income countries as compare to upper middle countries in GDP per capita. The value of human development index is the highest in upper middle income

countries followed by lower middle income countries and lower income countries respectively. But the variation is also highest in the group of upper middle income countries which indicates huge differences in the sample regarding the human development index. The lower income countries show least variation in the sample.

3. Data and Methodology

The sample is comprised of low income developing countries. The data availability on different variables further restricted the sample to 107 developing countries. Following Fosu (2011) we used Poverty head count ratio at

$ 1.25 a day (Pov1) and Poverty head count ratio at $ 2 a day (Pov2) as an indicator of poverty. As described in Dollar and Kraay (2002) and Rodriguez and Rodrik (2001) the ratio of import plus export to GDP is used to measure the trade openness (openness) of a country. Following Ali and Thorbecke (2000) that poverty is sensitive to income, we used per capita GDP (GDP/capita) in our analysis to measure the possible rapport. We also used Human Development Index (HDI) and secondary school enrolment (SSE) to gauge the possible relationship with poverty. To incorporate demographic properties of the countries we used the distance form equator (DISTEQ) and land lockedness (Landlkd) of country which can affect both poverty and openness (Trevio 2002).

The main relationship to be estimated is given as under:

$$Poverty = f(Demographic\ variables + Economic\ variables)$$

In equation form can be written as:

$$Pov_1 = \alpha_0 + \alpha_1 openness + \alpha_2 landlkd + \alpha_3 disteq + \alpha_4 GDP/capita + \alpha_5 HDI + \alpha_6 SSE$$

The estimable econometric form of the model is given as

$$Pov_1 = \alpha_0 + \alpha_1 openness + \alpha_2 landlkd + \alpha_3 disteq + \alpha_4 GDP/capita + \alpha_5 HDI + \alpha_6 SSE + \mu_1$$

... (A)

Similarly the estimable equation for poverty head count ratio at $2 a day can be written as follows:

$$Pov_2 = \beta_0 + \beta_1 openness + \beta_2 landlkd + \beta_3 disteq + \beta_4 GDP/capita + \beta_5 HDI + \beta_6 SSE + \mu_2$$

.. (B)

Where   and   are random terms for model A and Model B respectively.

All the level variables are in log form. The data is taken from the World Development Indicators (2011) the publication of the World Bank. We used descriptive statistics to give general profile of developing countries and also about the sub sample of countries. Pearson correlation

coefficient is used to analyse any possible relationship in overall sample and to check whether relationship is same across sub-samples. To study the magnitude of relationship we used regression analysis. In regression analysis we used ordinary least square (OLS) technique to estimates coefficients of variables.

4. Analysis

4.1 Correlation Analysis

In correlation analysis we first present the correlation analysis of the variables for the whole sample and then we divide this analysis according to the income groups as mentioned earlier.

The table 2 shows the correlation coefficients of all the variables for the sample of developing countries (all income groups). Poverty head count ratio at $1 and $2 a day both are negatively correlated with all the variables except demographic variable landlock. It shows that land locked countries are more vulnerable to poverty because it shows positive and significant correlation coefficient with poverty variables. While the other demographic variable distance from equator (DISTEQ) indicates negative correlation with both poverty indicators. The relationship of poverty variables with HDI is also negative and insignificant. Education proved to be poverty reducing variable as its coefficient indicate negative and significant relationship with poverty at both levels.

The correlation coefficient for openness shows positive and significant relationship with GDP per capita for the sample of developing countries. It shows negative and insignificant relationship with HDI and Landlkd.

Table 3 presents the Correlation coefficients for the sub sample Lower income developing countries. Results indicate that behavior for the poverty 1 and poverty 2 variables is similar as in case of overall sample except Human development index. It has become insignificant in case of Lower income countries. While openness indicator shows that the

Table 2: Pearson's correlation coefficients for developing countries (All income groups)

	Pov1	Pov2	Openness	Landlkd	DISTEQ	GDP/capita,	HDI	SSE
Pov1	1							
Pov2	.961[**]	1						
Openness	-.330[**]	-.382[**]	1					
Landlkd	.289[**]	.267[**]	-.034	1				
DISTEQ	-.410[**]	-.399[**]	.090	.171	1			
GDP/ capita	-.515[**]	-.538[**]	.351[**]	-.170	.282[*]	1		
HDI	-.105	-.087	-.226	-.063	-.181	-.011	1	
SSE	-.427[**]	-.420[**]	.129	-.075	.371[**]	.540[**]	-.115	1

**,*Correlation is significant at the 0.01 , 0.05 level (2-tailed) respectively

Note: Poverty headcount ratio at $1.25 a day (Pov1), Poverty headcount ratio at $2 a day (Pov2), Land locked (landlkd), Distance from equator (DISTEQ), Human Development Index (HDI) and Secondary School Enrolment (SSE) respectively.

Table 3: Pearson's correlation coefficients (lower income Developing countries)

	Pov1	Pov2	Openness	Landlkd	DISTEQ	GDP/capita,	HDI	SSE

	Pov1	Pov2	Openness	Landlkd	DISTEQ	GDP/ capita	HDI	SSE
Pov1	1							
Pov2	.943**	1						
Openness	-.301*	-.370**	1					
Landlkd	.092	.025	.000	1				
DISTEQ	-.470**	-.452**	.236	.224	1			
GDP/ capita	-.505**	-.537**	.299	-.099	.303	1		
HDI	-.024	-.003	-.095	-.092	-.150	-.080	1	
SSE	-.458**	-.449**	.023	-.087	.392*	.547**	-.250	1

**,*Correlation is significant at the 0.01, 0.05 level (2-tailed) respectively.
Note: Poverty headcount ratio at $1.25 a day (Pov1), Poverty headcount ratio at $2 a day (Pov2), Land locked (landlkd), Distance from equator (DISTEQ), Human Development Index (HDI) and Secondary School Enrolment (SSE) respectively.

Table 4: Pearson's correlation coefficients (Lower middle income developing countries)

	Pov1	Pov2	Openness	Landlkd	DISTEQ	GDP/capita,	HDI	SSE
Pov1	1							
Pov2	.944**	1						
Openness	.210	.079	1					
Landlkd	.210	.104	.287	1				
DISTEQ	-.347*	-.410**	-.075	.321*	1			
GDP/ capita	-.117	-.132	.147	.134	.140	1		
HDI	-.040	-.001	-.445*	.051	-.184	-.046	1	
SSE	-.033	-.070	.361	.228	.022	.603**	-.095	1

**,*Correlation is significant at the 0.01, 0.05 level (2-tailed) respectively.
Note: Poverty headcount ratio at $1.25 a day (Pov1), Poverty headcount ratio at $2 a day (Pov2), Land locked (landlkd), Distance from equator (DISTEQ), Human Development Index (HDI) and Secondary School Enrolment (SSE) respectively.

Table 5: Pearson's correlation coefficient (Upper middle income developing countries)

	Pov1	Pov2	Openness	DISTEQ	GDP/capita,	HDI	SSE
Pov1	1						
Pov2	.900**	1					
Openness	-.092	-.033	1				
DISTEQ	-.470	-.577*	-.449	1			
GDP/ capita	-.262	-.036	.031	.312	1		
HDI	.298	.295	-.499	-.396	-.171	1	
SSE	-.829**	-.609	-.348	.599	.542	-.080	1

**,*Correlation is significant at the 0.01, 0.05 level (2-tailed) respectively.
Note: Poverty headcount ratio at $1.25 a day (Pov1), Poverty headcount ratio at $2 a day (Pov2), Land locked (landlkd), Distance from equator (DISTEQ), Human Development Index (HDI) and Secondary School Enrolment (SSE) respectively.

coefficient of all the variables behaves insignificantly with it. Contrasting result is found in case of per capita GDP. It was positive and significant in case of overall sample while it has insignificant relationship in a sub sample of lower income developing countries.

Contrasting results are found in case of sub sample of lower middle income developing countries. Correlation coefficients are reported in table 4. All the variables have become insignificant except one demographic variables indicating that in case of lower middle income countries, demographics have significant role in poverty reduction. On the other hand openness has significant and negative relationship with HDI contrary to the overall sample and lower income countries results for developing countries where it was insignificant. The results of Pearson's correlation coefficients for upper middle income developing countries are presented in table 5. Almost similar behavior of variables is evident as it was found in

case of lower middle income developing countries. All the variables behave insignificantly with Pov1 and Pov2 except SSE and DISTEQ. Secondary school enrolment (SSE) has shown significant relationship with pov1 variable while it has insignificant relationship with all other variables of the study including Pov2. The demographic variable DISTEQ has shown insignificant relationship with Pov1 while it has significant relationship with Pov2 variable. In the sample of upper middle income developing countries, Openness has also insignificantly correlated with all other variables including Pov1 and Pov2. The above correlation analysis indicates that the behavior of variables varies across samples. We can infer from this analysis that the relationship changes according to the income groups. To further probe in the relationship of these variables we extend our study to regression analysis.

4.2   Regression Analysis

4.2.1   Overall Sample

We perform the regression analysis by using poverty head count ratio at $1 a day and Poverty head count ratio at $2 a day, as dependent variable in two separate equations. The table 6 presents the regression results for the sample of developing countries including all income groups together.

Results indicate that in model A, independent variables can explain 53 percent variations in the dependent variables. The value of F statistic indicates the significance of the Model A. The coefficients of the trade openness indicate that it has significant and negative relationship with pov1 variable in the sample of developing countries. It means that as openness increases the poverty will decrease and vice versa. The demographic variable land locked and distance from equator has significant relationship with dependent variable but in different directions. Land lockedness proved to be contributing factor to poverty in our sample while the coefficient of distance from equator (DISTEQ) has shown that it has negative relationship with pov1. The GDP per capita, human development index (HDI) and secondary school enrolment (SSE) has significant and negative coefficients showing poverty reducing behavior.

The results of Model B indicate that the independent variables can explain 55 percent variations in the dependent variable Poverty head count ratio at $2 a day and F-test shows the significance of the model. All the coefficients are statistically significant. The coefficient of trade openness indicates that it has significant and negative relationship with poverty head count ratio at $2 a day. It shows a little strong relationship than with poverty head count ratio at $1.25 a day.

The relationship of all the variables with dependent variable is significant and negative except landlocked. It has significant and positive relationship with dependent variable showing contributing behavior towards poverty at $2 a day.

4.2.2   Sub-samples

We replicated Model A on our subsamples to further probe into the question that whether the relationship of these study variables remains the same across sub samples or it differs with change in income level in the countries. The results are reported in table 7. The results indicate that independent variables can explain 41, 31 and 92 percent variations in dependent variable in the sample of lower income, lower middle income and upper middle income countries respectively. The value of F-test indicates the significance of the model for lower income and upper middle income countries sample, while for lower middle income countries the model has become insignificant. The regression results show contrasting behavior of variables as compared to the results of main sample. All the variables have become insignificant in case of lower income countries.

Table 6: Regression results for the sample of developing countries (All income groups)

Dependent Variables	Model A Poverty headcount ratio at $1.25 a day			Model B Poverty headcount ratio at $2 a day		
Independent Variables	Coefficients	Std. Error	t	Coefficients	Std. Error	T
Trade Openness (Openness)	-.279	3.521	-2.851	-.335	4.264	-3.565
Land Locked (landlkd)	.270	4.923	3.023	.213	6.147	2.448
Distance from equator (DISTEQ)	-.273	.145	-2.836	-.282	.179	-3.026
GDP per capita,	-.194	.001	-1.665	-.230	.001	-2.079
Human Development Index (HDI)	-.216	2.423	-2.405	-.200	3.029	-2.280
Secondary School Enrolment (SSE)	-.213	11.294	-1.914	-.178	13.775	-1.680
(Constant)	60.232	17.545	3.433	76.97	21.925	3.510
R square	0.536			0.553		
F-test	11.751 (0.000)			12.761 (0.000)		

While in case of lower middle income countries only demographic variables behave significantly with poverty. The signs of these two variables are similar as in the main sample results. The coefficients of secondary school enrolment, GDP per capita and openness has shown significant relationship with dependent variable with negative signs. The coefficient of trade openness variable has insignificant relationship with poverty head count ratio at $1.25 a day, in case of lower income and lower middle income countries indicating that there is no effect of trade liberalization on the poverty. On the other hand for upper and middle income countries it has significant and negative coefficient. This result shows that trade openness has poverty reducing behavior in upper middle income countries.

Table 7: Regression estimates for the sample of developing countries (Sub Samples)

Dependent Variable: Poverty headcount ratio at $1.25 a day					
	Lower Income		Lower middle income		Upper middle income	
Independent variables	Coefficients	Std. Error	Coefficients	Std. Error	Coefficients	Std. Error
Trade Openness (Openness)	-.206	5.914	.041	6.127	-.608*	.405
Land Locked	.147	7.029	.418***	7.643	-	-
Distance from equator (DISTEQ)	-.202	.255	-.436**	.198	-.245	.018
GDP per capita,	-.213	.002	.009	.001	.490*	.000
Human Development Index (HDI)	-.156	4.686	-.177	2.944	.075	.286
Secondary School Enrolment (SSE)	-.277	17.074	-.311	26.455	-1.154*	.929
(Constant)	76.614*	25.872	73.36	45.668	20.43*	1.263
R-Square	0.419		0..314		0.922	
F	3.360 (.013)		1.297 (.311)		71.125 (.003)	

To analyze the behavior of independent variables with poverty head count ratio at $2 a day, we replicate Model B on the sub sample of the countries. Results are reported in table 8. The value of R-square indicates that for the sample of lower income countries independent variables can explain 43 percent variation in dependent variable with significant F-test value. The model has become insignificant in case of lower middle income countries with explanatory power of 27 percent. For the upper middle income countries independent variable explains 91 percent variation in the dependent variable with significant F-test value.

The results indicate that all the variables has become insignificant in case of lower income countries and lower middle income countries, while in case of upper middle income countries they posses significant behavior except Human development index(HDI). The coefficient of HDI has insignificant relationship with pov2 variable in contrast to the results of our main sample results. The coefficient of GDP per capita has shown contrasting behavior with positive sign as compared to main sample results.

Table 8: Regression Results for the Sample of Developing Countries (Sub Samples)

Dependent Variable: Poverty headcount ratio at $2 a day					
Income level	Lower income		Lower middle income		Upper middle income	
Independent Variables	Coefficients	Std. Error	Coefficients	Std. Error	Coefficients	Std. Error
Trade Openness (Openness)	-.251	6.317	-.070	7.860	-.901**	2.991
Land Locked	.047	7.508	.351	10.019	-	-
Distance from equator (DISTEQ)	-.184	.272	-.484**	.260	-.917***	.132
GDP per capita,	-.277	.002	.029	.002	.649**	.000
Human Development Index (HDI)	-.130	5.006	-.161	3.934	-.194	2.111
Secondary School Enrolment (SSE)	-.245	18.239	-.284	33.886	-.741***	6.856
(Constant)	96.37*	27.636	93.430	60.482	32.867**	9.318
R Square	0.437		0.273		0.916	
F	3.629 (.009)		1.126 (.387)		6.542 (.077)	

5. Conclusion

The current paper explored the relationship between trade liberalization and poverty in a sample of low income countries. Our investigation established the fact the relationship of these two variables in overall sample of developing countries is negative i.e. the trade liberalization leads to reduce poverty in selected sample of developing countries. The correlation analysis concluded that the said relationship in not same across the different income groups. Openness and poverty (Pov1 and Pov2) has significant relationship in the low income developing countries, while this relationship is insignificant in the sample of lower middle income and upper middle income countries. It leads

us to the conclusion that this relationship varies across different income groups. Further regression analysis established that the role of openness is significant in poverty reduction at both levels of poverty (Pov1 and Pov2). But these results differ according to the income groups of sample. Only upper middle income countries are more benefitted from this trade openness while rest of income groups are seems not to be benefitted from trade openness strategy as they are less open than upper middle income developing countries. Trade policies of developing countries needed to be open and agriculture based and the trade share of their agriculture should be increased just to benefit the poor more. Further their agriculture should be

trade oriented. The agriculture production can be more market oriented so that poor could be more benefitted being producer rather being consumer.

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