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   HYPOTHESES

   RESEARCH METHODOLOGY

   RESULTS & DISCUSSION

   FINDINGS

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ECONOMIC GROWTH, INCOME INEQUALITY, AND POVERTY: EVIDENCE FROM BANGLADESH, 1981-82 TO 2009-10

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ABSTRACT

It is commonly understood that poverty can be reduced through increasing economic growth, improving income distribution or through a combination of both. Economic growth may be followed by a high income inequality and thus an effort to alleviate poverty through economic growth may be hampered. This paper examines the inter-relationships between economic growth, income inequality and poverty within the framework of the Bangladesh economy using the data for the period between 1981-82 and 2009-10. The empirical results indicate that economic growth not only reduces poverty but also increases income inequality. As a result, the effectiveness of economic growth in reducing poverty is decreased to an extent by rising income inequality. The effect of sectoral growth on poverty indicates that agriculture and industry effectively reduce poverty while power, gas, water and sanitary services have insignificant effect on poverty reduction. In contrast, the growth of public administration and defence tends to increase poverty marginally. Based on the aforementioned findings, the study suggests that Bangladesh should achieve an economic growth which reduces poverty fast and at the same time produces less income inequality.

KEYWORDS

Bangladesh economy, economic growth, income inequality, poverty.

INTRODUCTION

It is widely accepted that poverty reduction can be accomplished by economic growth and/or income distribution. Growth can significantly reduce poverty as it is often followed by more output, more income and consequently more wellbeing of the people. However, growth may increase income inequality where the benefit of growth goes to a few rich rather than the many poor and poverty reduction through economic growth may be hampered. Therefore, the basic issue in reducing poverty through economic growth is not only how to make an economy grow, but also who make it grow, a few or the many.

Bangladesh is believed to have performed well over the years as far as the indicators are concerned. Economic growth rate crossed the 6 percent mark in recent years from a feeble 4 percent or below in the 1980s and 5 percent plus in the second half of the 1990s (Bayes, 2010). The country is thus moving from low to moderate economic growth. But how this growth benefited the poor has been a central issue and thus the quality of economic growth, apart from quantity, has recently emerged as an area of attention.

The objective of this paper is to examine the interactions between economic growth, income inequality and poverty. The study investigates how economic growth and income inequality affect poverty. It also looks into the effect of sectoral growth on poverty. The results show that poverty which seemed a never-ending problem in Bangladesh witnessed a significant reduction. But the efficiency of poverty reduction through economic growth has been hampered by a rising income inequality. The paper is organized as follows. Section 2 reviews the analytical arguments regarding the relationship between economic growth, poverty and income distribution. Section 3 describes the methodology for estimating growth, inequality and poverty relations. The next section presents the main findings and analysis. Section 5 concludes.

REVIEW OF LITERATURE

The inter-relationship between economic growth, income inequality and poverty is that economic growth which produces less income inequality reduces poverty faster. The benefit of growth usually spreads among people which in turn increases their ability to spend more on the essentials that they could not do when they had low level of income. Generally economic growth and poverty reduction move together. However, growth *per se* may not reduce poverty as expected when it is followed by an increasing income inequality. Hence, the link between economic growth, income inequality and poverty has been an ongoing issue in the literature of economic development.

Economic growth may increase income inequality because the income of people working in higher value-added sectors such as manufacturing will generally rise faster than those in the lower value-added sectors such as agriculture. Kuznets (1955) argues that growth is accompanied by a worsening income distribution in the early stages of development. The majority of a country's population would remain in agriculture, whilst a minority would move into manufacturing and therefore earn higher incomes. The resulting divergence of incomes would not be permanent as most people would eventually move into higher value-added activities.

Todaro and Smith (2009) state whether economic growth and poverty reduction are conflicting or not is still a debatable issue. A body of opinion held that rapid growth is bad for the poor, because they would be bypassed and marginalized by the structural changes of modern growth. If the poor get less share of national income, it leads to an increasing share of the rich and finally widens income inequality between these groups. Therefore, a better income distribution may help to reduce poverty in which there is less variation of income among various income groups. Bourguinon (2004) argues that poverty can be reduced by improving income distribution. Hanmer and Naschold (2000) also argue that growth is less effective in reducing poverty in high inequality countries. In some high inequality countries, particularly those with low rates of growth, this means that changes in income distribution may be more effective in reducing poverty than growth.

Lin (2003) finds that economic growth effectively reduces poverty in China. However, the study also reported that income inequality that is created by the increased economic growth reduces the effectiveness of poverty reduction. In his study, Ravllion (2006) finds a negative relationship between economic growth and poverty in India and China i.e. an increased economic growth in those countries is followed by a reduction of poverty. The study also finds that income inequality decreased the effectiveness of poverty reduction. He indicates that a combination of economic growth and income inequality reduction can better fight poverty alleviation. War (2006) studied the effect of sectoral growth on poverty which suggests that poverty reduction is helped well by the growth of agriculture and services sectors. Hidayat and Patunru (2007) when studied in Indonesia find that economic growth is not only followed by an increased income inequality but also by poverty reduction.

The survey of literature suggests that economic growth is an important means for poverty reduction. But the relationship between economic growth and poverty reduction is strongly determined by the pattern of income inequality. If the existing income inequality is high, growth has less impact on poverty. As a result, the same policy prescription may not work for all countries. For some countries, the growth maximizing policies may be adequate but for other countries, there may be a need to have pro-poor growth policies with a focus on reducing inequality (Kakwani & Pernia, 2000). The theoretical links among economic growth, income inequality and poverty can be complementing each other. Thus, an empirical investigation on such relationships can help understand how these variables interact.

METHODOLOGY

The study requires data on growth, inequality and poverty. The rise in gross domestic product is considered for economic growth. Income inequality is shown by Gini coefficients. Poverty line is defined as a daily per capita intake of 2122 kilo calories and the percentage of population living below this standard is termed as poor. All data are collected from secondary sources. The data cover the period between 1981-82 and 2009-10.

The ordinary least squares (OLS) linear regression models, both two-variable and multi-variable, are used to analyze and understand the extent of relationship among the variables considered. A two-variable regression model is sometimes appropriate as an empirical tool and learning how to interpret the simple regression model is good practice for studying multiple regression (Wooldridge, 2009). After data on relevant variables are collected, the following econometric methods are used to estimate the parameters in the econometric models. To find out the effect of economic growth on income inequality, we estimate a model relating income inequality (*incineq*) to economic growth (*ecngth*). The linear model explaining income inequality is

log(*inineq*) = β_0 **+** β_1 **log(*ecngth*) + u**--- (1)

In this model, β_0 is the intercept and β_1 is the elasticity of income inequality with respect to economic growth and u is the error or disturbance term. We estimate another model relating poverty (*pov*) to economic growth (*ecngth*) to see how economic growth changes poverty. The population model is

log(*pov*) = β_0 **+** β_1 **log(*ecngth*) + u**-- (2)

Where β_1 is the elasticity of poverty with respect to economic growth. In order to find out the joint and individual effect of economic growth and income inequality on poverty, we estimate the following population model relating poverty (*pov*) to economic growth (*ecngth*) and income inequality (*incineq*).

log(*pov*) = β_0 **+** β_1 **log(*ecngth*) +** β_2 **log(*inineq*) + u**-- (3)

In this model, β_1 and β_2 are the elasticity of poverty with respect to economic growth and income inequality respectively. Finally, we develop a model to understand the effect of sectoral growth on poverty. Only four sectors namely agriculture, industry, power, gas, water and sanitary services, and public administration and defence are considered. The other sectors are either highly correlated with these sectors or have trivial effect on poverty. The model relating poverty (*pov*) to the growth of agriculture (*agr*), industry (*indus*), power, gas, water and sanitary services (*pgwss*) and public administration and defence (*pad*) is

log(*pov*) = β_0 **+** β_1 **log(*agr*) +** β_2 **log(*indus*)+** β_3 **log(*pgwss*) +** β_4 **log(*pad*) + u**---------------------------------(4)

Where β_1, β_2, β_3 and β_4 are the elasticity of poverty with respect to the growth of agriculture, industry, power, gas, water and sanitary services and public administration and defence respectively.

RESULTS AND DISCUSSION

IMPACT OF ECONOMIC GROWTH ON INCOME INEQUALITY

In this section the estimated results of the models are shown with their explanations. The estimated equations are indicated by using *"hat."* Standard errors appear in parentheses below the estimated coefficients. Figures in brackets beneath the standard errors are probabilities. This convention is followed in all equations. Using the data on economic growth and income inequality, the estimated model shows the following results

$$\widehat{\log(inineq)} = 3.36 + .255 \log(ecngth)$$

Std. error (.1298) (.0854)

Prob. [.000] [.031]

R-squared = .64, Adjusted R-squared = .57

According to the model, income inequality is positively related to economic growth. The estimated elasticity implies that a 1% increase in economic growth increases income inequality by .255%. The statistical significance of regression coefficient indicates that economic growth is a significant predictor of income inequality ($p<.05$). The measure of goodness-of-fit as shown by adjusted R-squared indicates that 57% variation in income inequality is explained by economic growth. Alternatively, 43% variation in income inequality occurs due to the factors other than economic growth.

The model confirms that the Bangladesh economy experiences an increase in income inequality with growth. The economy is still highly dominated by agriculture and the poor living in rural areas commonly depend on agriculture. But the return from agriculture is less than that of industry and service sectors. There also exists an unequal distribution of land ownership. Again, the withdrawal of subsidies from agriculture inputs in various phases imposed a tax on the marginal farmers. These farmers have limited access to credit facilities. As a result, the major benefit of agriculture growth goes to a few rich farmers and land owners. On the other hand, the urban poor are engaged in low paid industry and service sectors. Industry sector is capital intensive and the growth of this sector increases income inequality. The pattern of income distribution in Bangladesh shows that the bottom 10% population received only 2.76% of national income in 1981-82 which decreased to 2% in 2009-10 indicating a net decrease of about 28% during this period. On the other hand, the top 10% population received 29.53% of national income in 1981-82 which increased to 35.84% in 2009-10 indicating a net increase of 21.37% in the same period. Given this distribution of income, economic growth brings benefit to few people which results in a high income inequality between the rich and the poor.

IMPACT OF ECONOMIC GROWTH ON POVERTY

Equation 2 is used to identify the effect of economic growth on poverty. The estimation of parameters produces the following results.

$$\widehat{\log(pov)} = 5.16 - .874 \log(ecngth)$$

Std. error (.2447) (.1611)

Prob. [.000] [.003]

R-squared = .86, Adjusted R-squared = .83

The coefficient comes up with the anticipated sign. Poverty is negatively related to economic growth which means a high economic growth is followed by a low level of poverty. The estimated elasticity of poverty with respect to economic growth implies that a 1% increase in economic growth lowers poverty by .874%. The statistical significance of regression coefficient indicates that economic growth is a very significant predictor of poverty ($p<.01$). The measure of goodness-of-fit indicates that 83% variation in poverty is explained by economic growth.

Although economic growth increases income inequality, evidence shows it also reduces poverty. It implies the poor are able to get a certain share of national income with the growth of the economy. The effort of successive governments in bringing the poor and vulnerable people under various social safety nets helped to reduce poverty to an extent. Besides, Bangladesh is a pioneer of micro-credit services with the help of which many poor in rural areas came out of poverty. In recent years, many micro-credit institutions started working in the urban areas with the objective of poverty alleviation. As a result, the combined effect of all these efforts helped the economy to grow and the growth in turn helped many to come out of poverty.

IMPACT OF ECONOMIC GROWTH AND INCOME INEQUALITY ON POVERTY

A two-predictor regression model is fitted to the data to understand the combined effect of economic growth and income inequality on poverty. The estimated model shows the following results.

$$\widehat{\log(pov)} = 6.33 - .785 \log(ecngth) + .348 \log(inineq)$$

Std. error (3.127) (.2955) (.9267)

Prob. [.113] [.057] [.727]

R-squared = .86, Adjusted R-squared = .79

F-statistic = 12.27, Prob. (F-statistic) = .01

According to the model, poverty is negatively related to economic growth and positively to income inequality. Put it alternatively, a high economic growth is associated with a low level of poverty while a high income inequality is followed by a high level of poverty. The parameter estimation of economic growth implies, holding the effect of income inequality fixed, a 1% increase of economic growth decreases poverty by .785%. In contrast, *ceteris paribus*, the coefficient of income inequality implies that a 1% increase in income inequality increases poverty by .348%.

The statistical significance indicates the model is jointly significant at 5% level of significance ($p<.05$). This test alone does not say which predictor has significant effect on poverty and thus it is crucial to look at the estimate of individual coefficients and their probability values. The individual coefficients indicate that economic growth is a significant predictor of poverty ($p<.10$) while income inequality fails to be so even at 15% level of significance. The measure of goodness-of-fit indicates that 79% variation in poverty is explained by economic growth and income inequality. In other words, only 21% variation in poverty is left to other variables.

The finding suggests economic growth and income inequality have opposing effect on poverty. This occurs because income inequality increases to a great extent with economic growth and economic growth is a significant predictor of income inequality. But when economic growth and income inequality are taken together, the effect of economic growth on poverty reduction dominates the inequality effect. And the effort of poverty reduction through economic growth is partially cancelled out by the increasing income inequality.

IMPACT OF SECTORAL GROWTH ON POVERTY

Equation 4 is used to identify the effect of sectoral growth on poverty reduction. The estimation of parameters produces the following results.

$$\widehat{\log(pov)} = 4.745 - .305 \log(agr) - .353 \log(indus) - .128 \log(pgwss) + .113 \log(pad)$$

Std. error (.313) (.107) (.085) (.108) (.124)

Prob. [.004] [.104] [.053] [.359] [.458]

R-squared = .96, Adjusted R-squared = .87

F-statistic = 11.34, Prob. (F-statistic) = .08

As the model shows, poverty is negatively related to the growth of agriculture, industry, power, gas, water and sanitation (utilities) and positively to public administration and defence. In other words, while the growth of agriculture, industry and utilities is followed by a reduction of poverty, the growth of public administration and defence is associated with an increase of poverty. The parameter estimation of agriculture, for example, implies that holding the effect of other variables constant, a 1% increase in the growth of agriculture decreases poverty by .305%.

The model remains jointly statistically significant ($p<.10$). But the estimation of individual coefficients indicates agriculture and industry are significant predictors of poverty at 10% and 5% respectively while other sectors fail to be so at the standard levels of significance. The measure of goodness-of-fit indicates that 87% variation in poverty is explained by the variables included in the model. This result also justifies the non-inclusion of other sectors in the model.

These findings indicate that the growth of agriculture and industry are beneficial to poverty reduction. The Bangladesh economy is vastly dominated by agriculture on which a good number of rural poor remain dependent. Thus, any growth of this sector helps to reduce poverty to an extent. The effect of industry sector growth on poverty can be explained as follows. This sector consists of large and small scale industries. The large industry is highly dominated by readymade garment manufacturing which employs a good number of rural and urban poor. The poor women who would otherwise remain unemployed found a new avenue of generating additional income to improve their standard of living after they had joined this sector. The small industry which mainly consists of handlooms, carpet-making, shoe-making, coir, bamboo and cane products, earthenware contributes a lot in alleviating poverty.

CONCLUSION

Early studies on the relationship between growth and poverty believed that benefits of economic growth automatically trickle down to the poor. The recent studies view that income distribution largely determines how much the poor benefit from economic growth. The present study confirms that economic growth significantly reduces poverty. However, income inequality tends to rise with economic growth which affects the poverty reduction capacity of growth. As a result, the objective of poverty reduction through economic growth is partially cancelled out by the corresponding increase of income inequality. The study also discovers that the growth of agriculture and industry reduces poverty considerably while the growth of utility sector has insignificant effect on poverty reduction. In contrast, the growth of public administration and defence marginally increases poverty.

The study finds that economic growth and income inequality are intrinsically linked and they matter for poverty reduction. There is no doubt that growth is good for poverty reduction. But it must be considered how much benefit the poor get out of growth in their existing share of income because growth effect on poverty reduction may sometimes be dominated by income inequality effect. For Bangladesh, growth effect on poverty reduction dominates income inequality effect. Yet income inequality matters as long as poverty reduction is concerned. Thus, any policy for poverty reduction should be directed toward achieving an economic growth which reduces poverty fast and at the same time produces less income inequality.

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APPENDIX

TABLE 1: ECONOMIC GROWTH, INCOME INEQUALITY, AND POVERTY, 1981-82 TO 2009-10

Year	GDP growth (Annual average percent)	Gini coefficients	National poverty (percent of population)
1981-82	2.70	39	73.0
1985-86	4.30	38	55.7
1991-92	3.77	39	47.5
1995-96	4.54	43	47.5
1999-00	5.34	45	44.3
2004-05	5.40	47	40.0
2009-10	6.22	46	31.5

Note: Poverty line in 1985-86 is estimated based on daily per capita intake of 1800 kilo calories.

Sources: Own estimates and

(1) BBS, *Twenty Years of National Accounting of Bangladesh 1972-73 to 1991-92*, 1993
(2) BBS, *Statistical Yearbook of Bangladesh*, various issues
(3) BBS, *Household Income and Expenditure Survey,* various issues
(4) BB, *Monthly Economic Trends* 2011

TABLE 2: SECTORAL GROWTH RATES (ANNUAL AVERAGE PERCENT) OF GDP AT CONSTANT MARKET PRICES, 1981-82 TO 2009-10

Year	Agriculture	Industry	Construction	Power, gas water & sanitation	Transportation & communication	Trade services	Housing services	Public administration & defence	Banking & insurance
1981-82	1.48	1.39	10.38	16.25	3.76	3.82	3.06	4.71	11.67
1985-86	2.96	2.60	7.65	20.30	4.89	4.83	3.11	17.15	11.22
1991-92	2.06	4.71	6.03	20.05	5.09	3.55	3.31	7.21	2.37
1995-96	1.49	8.42	8.33	6.07	4.29	4.81	3.40	7.18	4.45
1999-00	4.34	5.39	8.88	4.18	5.79	6.32	3.75	5.77	5.33
2004-05	2.88	6.84	8.38	8.21	7.09	6.55	3.52	6.42	6.97
2009-10	4.50	8.18	6.54	6.07	8.05	6.74	3.78	7.63	9.44

Sources: Own estimates based on

(1) BBS, *Twenty Years of National Accounting of Bangladesh 1972-73 to 1991-92*, 1993
(2) BBS, *Statistical Yearbook of Bangladesh*, various issues
(3) BB, *Monthly Economic Trends* 2011

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