

## **Role of Spending on Education in Growth of Bangladesh: Few Insights**

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*Education is one of the prime movers of growth and no matter what level of mechanization and automation a country achieves, it needs to have competent work force for its growth. Importance of education has been emphasised both in theoretical as well as empirical studies. Bangladesh has recently graduated as a country from low income group to middle income group (following the definition of the World Bank). In this process, role of education is more important than ever for Bangladesh. Surviving as a middle-income country and ensuring further growth will be difficult without getting support from adept, articulated workers. Bangladesh has invested huge amount of money along with taking necessary policy measures to enhance education. The most striking of those is mandatory primary education for all and stipends for female students. Using disaggregated data of education (primary, secondary and tertiary) and for the period 1980-2012, preliminary results found considerable evidence for education effecting economic growth. Using Granger Causality test, it shows that all levels of education affects growth in two to four years. Results are found to be robust across different specifications and estimation techniques. For inequality, there is considerable evidence of effect from primary and secondary education.*

**JEL Codes:** I24 and O4

### **1. Introduction**

Education has been an important tool for economic growth and development. Investing in education is believed to aid in creation of human capital, increases labour productivity and helps to adapt to new technologies. For developing countries, it is said that education is key to economic development. In the context of Bangladesh, it has successfully made its way to the middle-income group from the least developed country status (LDC). However, increase in income per capita does not necessarily eliminate other economic problems or promises further economic growth. Based on last few decades, a concern has risen that many countries were not able to move pass the middle-income bar and towards the high-income group (Felipe et al., 2012). In addition, higher income per capita does not necessarily erase other economic development issues. Middle income countries are challenged with economic problems such as inequality and distribution, poverty, fertility rates etc. The pressing issue is, even though the developing countries make it to the middle-income status; they still have the highest proportion of poverty and inequality (Unicef, 2011). The high initial inequality tends to lessen further economic growth and poverty reduction (Lopez, 2006). For Bangladesh, it is important to implement policies to avoid any chance of falling into 'middle income trap' and make sure it can sustain its economic growth. Among many other issues, past empirical studies have focused on education for economic growth and inhibiting

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inequality (example: Barro, 2000; Sylwester, 2002; Martin & Pereira, 2004). The explanation being that education attainment allows individuals to get better jobs, more income and more importantly increased opportunities for the poor (Blanden & Machin, 2004). And with government subsidies, it would provide further opportunities for the poor to acquire education which leads to higher productivity and output.

Bangladesh has significantly performed well in providing primary education and the government has taken significant role in providing the basic education (Ahmad & Haque, 2011). The education sector has received around 11% of the national budget in 2012-2013 which is the highest spending on social welfare (Karim, 2015). However, the biggest portion of the money goes to primary education and very little to the secondary and tertiary education sector. The public sector heavily is focused on primary education trying to achieve 100% enrolment where from demographics we see that literacy rate grew from 47% to 57% from 1997 to 2010. This is a considerable increase despite the population growth. The basic human rights and goal of providing primary education for all may have been a good policy for moving from least developed country to a middle-income country for Bangladesh, but question arises can it do enough for the country to prosper as a middle-income country (MIC), where the world bank defines a MIC country as countries with per capita gross national income between US \$1036 to \$12615. With education being a tonic for inequality inhibition and inequality being a pressing issue for MIC, Bangladesh may need to reform its Education Policy to deal with the economic problem. With economic growth, it generates opportunities for employment, but with lack of skilled labour, it does not help much and people still remain unemployed (Hajela, 2012). Hence the growth does not aid in inequality reduction. As the economy goes through the transition and structural change it becomes pertinent that the structure of employment changes (Felipe et al., 2012). There becomes a need for skilled labour and the lack of supply can lead to further inequality. This could possibly be avoided by focusing on higher education. But for Bangladesh, the access to higher education is mostly enjoyed by relatively well-off people who can afford it and with the poor being deprived can cause further increase inequality (Karim, 2015). Bangladesh is currently pursuing export promotion (with a weak preference to import substitution) policies. That worked perfectly well in recent past to generate decent growth. Sooner or later it has to go for technology substitution to attain a sustained growth as a MIC. Therefore, there is no substitute for investing in tertiary education (in form of research spending). This proposed paper builds on the previous paper (Rahman & Senan, 2015) which theoretically demonstrates that starting from a society of households equal in endowment and income potential, inequality may develop due to their (expenditure and other) preferences which may take a long time (assuming around 50 generations) to wane out. Investing in education can expedite the convergence process. However, we did not distinguish between investing in primary or tertiary education there. In this paper, we want to do that empirically using Bangladeshi data.

According to Pan (2014), higher or tertiary education allows country to participate in the world economy and provide skilled labour; hence it should be one of the top priorities for developing economies. Being a MIC, Bangladesh may need to invest more in higher education to generate competitive skilled labour for further development. In the last few decades, private sector has invested and performed very well in the higher education sector. This would help Bangladesh to produce skilled labour and also in knowledge creation and research and development. However as noted before, high cost of attending private education can be unaffordable by the poor which would only benefit the elites (Gruber & Kosack, 2013). To reduce inequality and make higher education accessible to all, public sector may need to invest on tertiary education. This would allow reducing inequality and

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have sustainable development. Also, tertiary education would provide competitive advantage which is required for Bangladesh in their current stage of development (Brasington, 2002). Thus, the public sector can promote education targeted to producing high skilled workers via providing subsidies and through income transfers for the poor households (Bohm et al., 2015). The social return includes less inequality and higher income earned by individuals and also the indirect benefit of generating human capital through education (Viane & Zilcha, 2013). Theoretically as well, urbanization or the shift from agricultural to industrial society causes structural change in the labour market, which advocates for more skilled labour and thus the need of higher education.

Along with economic growth and inequality, other macro variables have given importance to for effects of education. Fertility rates tend to be very high in developing countries which can be a pressing issue especially for a populous country like Bangladesh. Theoretically and most studies refer to an inverse relationship between education and fertility rate. Hence investing in education can be an important policy for population control.

Many literatures have also looked into the positive impact of rural credit on economic development. It is argued that rural credit positively affects the welfare and consumption of households and it is irrespective of status of the households (Quach et. al, 2005). However, there is debate whether education can attract rural credit or it is the other way around. This proposed paper will add into existing vast empirical literature on education with experience from Bangladesh. Results will be insightful for policy makers in shaping educational policy specially to sustain growth as MIC and more specifically to avoid what is known in literature as the 'middle income trap'. To answer these questions, an empirical estimation will be conducted to compare the relation between different levels of education (primary, secondary and tertiary) and growth with a possible extension towards other macro variables (inequality, fertility rate and rural credit). With scarce resources, there should be plausible justification to which level of education should be focused upon for economic growth and reducing inequality.

The paper is organized as follows: the first section will present the introduction which will be followed by a discussion on relevant literature. Discussion on methodology and data will be presented in the subsequent section 3 which will be followed by discussion on results obtained on section 4. Usual concluding remarks will be presented in the last section.

## 2. Literature Review

There has been a vast literature on the relationship between education and economic growth. Early papers like Mankiw et al. (1992) and the Barro (1991) based their studies on the convergence framework. Mankiw et al. (1992) used the augmented Solow model to test the returns of education on growth. Using secondary education enrolment data, the study found considerable positive effect of education on growth. The econometric specification used by Mankiw et al. (1992) was also implemented by Benhabib and Spiegel (1994). Instead of using secondary enrolment data, the study used the Kyriacou (1991) educational attainment data for empirical investigation. However estimated results present negative coefficient for education. The study then used an alternative model to account for the effect of education for growth. They allowed human capital to enter the equation in level term which can affect the output growth through the country's ability to innovate and through the technology imitation. Hence the study brought in the role of education for skill development for adaptation and also for research and development. Using ordinary least squares (OLS) estimation and for a sample of 78 countries, the estimation generated a positive significant coefficient for the

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education under the different model specification. Barro (2013) has considered the returns of education at disaggregated levels (primary, secondary and tertiary) for growth. For a panel data of 100 countries over the period 1960-1995, the study found different effects of education for growth for men and women. For men, the higher education is significant for economic growth whereas for women it is insignificant. This illustrates higher educational background is complementary for research and development and for adaptation to new technologies and at the same time women are not fully utilised in the labour market (Barro, 2013). On the hand, primary education is significant for women but not for men for economic growth.

Krueger and Lindahl (2001) constructed their own education data for their empirical estimation. Using their own data, for cross-country regression, the accumulation of education resulted in a positive correlation with economic growth. In similar manner, following the Krueger and Lindahl (2001) procedure, De la Fuente and Doménech (2000) also constructed their own data on education attainment for the OECD countries. The estimated output depicts that the measurement errors can produce a downward bias on the education coefficient. Using their own data set, for a sample of OECD countries, the authors found robust positive effect for education in determining economic growth.

Islam (2014) have analysed the education growth relationship for Bangladesh using annual data from 1973-2010 and using cointegration method. With education expenditure data representing education, the study found positive relationship between education and growth however the causality is unidirectional where economic growth causes education. Islam et. al (2007) have looked into the relationship between education and growth for Bangladesh using multivariate causality analysis using annual time series data from 1976 to 2003. The study found evidence for bi-directional causality between economic growth and education. Bartel and Lichtenberg (1987) and Foster and Rosenzweig (1995) also explored the role of education for economic development through technology diffusion. Bartel and Lichtenberg (1987) found evidence for educated workers having more comparative advantage in learning and adapting to new technologies that are channelled through spill over effects. On the other hand, Foster and Rosenzweig (1995) empirically supported the role of education for technology adaption in determining output growth using India's firm level micro data. They suggested that experienced farmers tend to learn new technologies faster and are more able to intimate the neighbouring firm's spill overed knowledge.

Many studies have also looked into the role of education on inequality along with growth. Existing literature has mixed results for the education-inequality relationship. Some found a negative association between educational attainment and income inequality (for example: De Gregorio & Lee, 2002; Park, 1996) while others found a positive association (for instance: Deininger & Squire, 1998). Appleton et al. (2014) outlined about the increasing wage inequality in China even though its high economic growth. Much could be explained by physical capital being complementary to skilled labour. Hence if tertiary education generates skilled labour, people without access to higher education can cause higher wage inequality. Wang et al. (2014) have found considerable positive effect of higher education for growth for China but it can also contribute to increasing inequality where the wealthier section of the economy can only have access to the returns of education and become wealthier while the poor will be excluded from these opportunities. Thus, it is very crucial to implement policies for equal opportunity to the benefits of education. Barro (1999) looked into the relationship between inequality and education attainment level and found different results for different education levels. For primary education, the author found a negative relationship and for secondary education, the relationship is positive with inequality. In the context of Bangladesh,

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Karim (2015) used enrolment data of different levels of education and found that the investing on education to be pro-poor and the primary and secondary education helps to reduce inequality rather than tertiary education. Ferdousi and Dehai (2014) in their study commented that most labour in rural sector of Bangladesh is limited to low income jobs for lack of education. Without proper access to secondary and tertiary education, there exists an unequal distribution in human capital which makes difficult to reduce inequality.

As this study is considering the holistic role of education, it is important to look into the role of education on other important variables along with growth. Empirical studies have looked into the role of education on fertility rates. Education and status of women/mothers of a country is considered to be the most important factors influencing fertility rates (Basu, 2012). The hypothesis is that education promotes gender equality and thus reduces fertility rates as women become more educated and can make choices and takes decisions about their lives. Also with education, they are more informed and make intelligent choices (Basu, 2012). Shirahase (2000) have also looked into the role of higher education on the declining fertility rate for Japan. The study found that in Japan cohabitation is relatively low and hence marriage is a precondition for having children. Higher education effects the time of marriage, perceptions of individuals which eventually leads to declining of fertility rate. For Bangladesh, the population issue being so alarming and a national problem, it is interesting to look into the role of education on fertility rate to get further perspective of the social development along with economic growth.

Rural credit has been given considerable importance for few countries and in empirical studies as well. The notion is that access to rural credit would aid in welfare of the society, create jobs and hence eventually income and economic growth. This has been supported by many empirical studies (for example: Morduch (2005); Pitt and Khandker (1998)). Tu et. al (2015) in their paper used data from 2010 to 2012 to study the effect of rural credit for Vietnam. The study found that along with other factors, education level is an important determinant in acquiring rural credit and enhancement of education level would lead to acquiring more credit and hence better living standard. On the other hand, it is claimed that access to rural credit is an important factor for increasing income for poorest households and thus increasing the wellbeing of the poorest lives (Giang et. al, 2015). This increased income and better living standard can induce further access to education which would imply rural credit aids in education rather the other way around. Hence in this study, we considered the effect of education on rural credit for different education levels to get a comprehensive perspective of its role in the context of Bangladesh.

### 3. Estimation Technique, Data and Methodology

For empirical analysis, first we conducted the Unit root tests to find out if the data series is stationary or non-stationary. Non-stationary data give rise to spurious regression results for which it is important for us to make our data stationary. We focused on the ADF and Phillips Perron unit test to check the stationarity of our data. In order to do so, we assume a hypothesis considering the data series to be non-stationary and integrated. If there is a clear proof of rejection, it is only then we reject the hypothesis. After unit root tests, we conduct the cointegration tests. Cointegration means that a linear combination of different order 1-integrated variables  $I(1)$  is stationary ( $I(0)$ ), and it implies the existence of an empirical long-run relationship between those variables. The Johansen's cointegration test was performed to find out existence of any possible relationship between variables. It is pointed out by Granger (1986, 1988) and Engel (1987) that if two variables are cointegrated then a causal relationship must exist between them, at least in one direction. However, cointegration test

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does not give the direction of relationship among variables therefore, once the cointegration is established, the next step is to investigate direction of causality existing between the variables. To investigate the causality between the variables, we took help of cointegrating regressions namely Fully Modified Ordinary Least Square (FMOLS), Canonical Cointegration Regression (CCR), and Dynamic Ordinary Least Squares (DOLS). These are single equation regression based methods and are variations of OLS method to avoid some problems that are common among cointegrating relationship. Fully modified ordinary least squares (FMOLS) regression is designed to provide efficient estimates of cointegrating regressions. The method modifies least squares to account for serial correlation effects and for the endogeneity in the regressors that result from the existence of a cointegrating relationship. In the same vein, CCR and DOLS estimators deal with the problem of second-order asymptotic bias arising from serial correlation and endogeneity.

For the data, we have used disaggregated levels of education, primary, secondary and tertiary to analyze the effect on GDP growth and other development indicators used in this study (inequality, fertility rate and rural credit). Enrolment data have been used for the different levels of education which are taken from the several Statistical Yearbook of Bangladesh generated by the Bangladesh Bureau of Statistics. Fertility rate is retrieved from the World Development indicators. Inequality and rural credit data are taken from the Statistical Yearbook of Bangladesh of different years.

### 4. Findings

For empirical analysis, we tested the different levels of education with economic growth, inequality, fertility rate and rural credit respectively. As stated, prior to testing cointegrating relationship, it is necessary to test for the order integration/unit root test for all the variables. If a variable is of unit root, it will be integrated of order  $I(d)$  where  $d \geq 1$ . Only variables which are unit root and their linear combination give error term to be  $I(0)$  will depict cointegrating relationship. All the unit roots depicted that the variables are integrated of order  $(d)$  where  $d \geq 1$ . To test for the direction of causality between variables, pairwise Granger Casualty tests are conducted. Once there is at least a uni-directional causality is found, we then see the potential effect of the variables using the different estimation methods.

#### 4.1 Primary Education

Table 1:

#### Pairwise Granger Causality Tests between primary education and economic growth

Lags:3	F-statistic	Prob
Primary education does not cause GDP	3.78	0.020
GDP does not cause Primary Education	0.18	0.912

#### Fully modified OLS with GDP as the dependant variable

Variable	Coefficient	T-Statistics	Prob
Primary education	5644.626	4.86	0.0000
Constant	-3.01E+10	-1.92	0.0620

Table 1 presents the pairwise causality test between primary education and GDP. The results show that there is a uni-directional effect running from primary education to growth, where within three lags primary education effects GDP growth. From the Fully Modified OLS (FMOLS) results in the next section of table 1, we also see the effect is positive and

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significant. Thus, from these results we can conclude that primary education effect economic growth. So, if parents are sending children to basic schooling, it is expecting to increase economic output within three years or so.

**Table 2:**

**Pairwise Granger Causality Tests between primary education and inequality**

Lags:1	F-statistic	Prob
Primary education does not cause inequality	13.47	0.0011
Inequality does not cause Primary Education	0.82	0.3735

**Fully modified OLS with Inequality as the dependant variable**

Variable	Coefficient	T-Statistics	Prob
Primary education	4.24E-07	1.93	0.0642
Constant	28.11161	8.87	0.0000

To understand the effect on other macroeconomic variables, in table 2, pairwise causality test is conducted between primary education and inequality. The results show that within one lag primary education influences inequality and effect is positive and significant. This means that once basic schooling is achieved, there causes a difference in income between the two groups within one lag which can potentially increase the inequality.

**Table 3:**

**Pairwise Granger Causality Tests between primary education and fertility rate**

Lags:1	F-statistic	Prob
Primary education does not affect fertility	0.09	0.76
Fertility rate does not affect Primary Education	4.24	0.05

**Pairwise Granger Causality Tests between primary education and fertility rate**

Lags:3	F-statistic	Prob
Primary education does not affect fertility	6.48	0.002
Fertility rate does not affect Primary Education	3.14	0.043

**Fully modified OLS with Fertility rate as the dependant variable**

Variable	Coefficient	T-Statistics	Prob
Primary education	-3.30E-07	-8.25	0.0000
Constant	8.560056	14.55	0.0000

For fertility rate, the results show that within one lag fertility rate has an effect on the attainment of primary education and within three lags there is a simultaneous effect running in both directions. From the FMOLS results in table 3, the coefficient of primary education is negative and significant which implies that primary education can help to reduce fertility rate. This is quite insightful for Bangladesh as being a very populous country, controlling fertility rate can be of prime importance.

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**Table 4:**

**Pairwise Granger Causality Tests between primary education and rural credit**

Lags:1	F-statistic	Prob
Primary education does not affect rural credit	0.16	0.69
Rural does not affect Primary Education	1.74	0.21

With rural credit, there is no potential relationship between the two. From table 4 we can see that there is no direction of causality running either ways. This could be because as primary education is mostly subsidized or made free by the government, so increase in rural credit does not have an income effect to send children to primary schooling. Also primary education is basic education which may not be influential enough to attract rural credit. Thus the estimation fails to find any convincing relationship between primary education and rural credit.

### 4.2 Secondary Education

The same analysis is now conducted using secondary education. Table 5 tests for any potential causality between secondary education and GDP. Contrary to what we found for primary education, this time we see that within two lags, GDP influences secondary education and the coefficient is positive and significant. So, this means that increase in income influences parents to send their children for secondary schooling which is plausible for Bangladesh as unlike primary education, secondary education is not heavily subsidised or made free by government. So there maybe the need for higher income to send children for secondary schooling.

**Table 5:**

**Pairwise Granger Causality Tests between secondary education and economic growth**

Lags:2	F-statistic	Prob
Secondary education does not cause GDP	0.07	0.94
GDP does not cause Secondary Education	3.08	0.06

**Fully modified OLS with Secondary Education as the dependant variable**

Variable	Coefficient	T-Statistics	Prob
GDP	0.000102	6.71	0.00
Constant	1569309.	1.82	0.08

With inequality, the result shows that secondary education effects and inequality and coefficient are positive and significant which is like what we found for primary education. Thus, this implies that inequality has no potential effect on primary and secondary education. However, attainment of primary and secondary education can result in income difference which results in the increase of the Gini coefficient.

With fertility rate, the results (table 7) show that within one lag there is a simultaneous effect running in both directions. We see similar result that we got for primary education, secondary education helps in reducing fertility rate. So, attainment of education would allow individuals to be well informed and make intelligent choices which would allow controlling the fertility issue.



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**Table 6:**

**Pairwise Granger Causality Tests between secondary education and inequality**

Lags:1	F-statistic	Prob
Secondary education does not cause inequality	6.03	0.02
Inequality does not cause Secondary Education	0.00	0.96

**Fully modified OLS with Inequality as the dependant variable**

Variable	Coefficient	T-Statistics	Prob
Secondary Education	8.27E-07	3.22	0.0033
Constant	28.19772	15.78	0.0000

**Table 7:**

**Pairwise Granger Causality Tests between secondary education and fertility rate**

Lags:1	F-statistic	Prob
Secondary education does not affect fertility rate	16.60	0.0003
Fertility rate does not affect Secondary Education	4.13	0.051

**Fully modified OLS with Fertility Rate as the dependant variable**

Variable	Coefficient	T-Statistics	Prob
Secondary Education	-2.19E-07	-2.08	0.0595
Constant	4.909987	4.49	0.0007

Rural credit with secondary is found to have an effect. From table 8, we can that within one lag, there runs causality from rural credit to secondary education and the effect is found to be positive and significant. This implies that rural credit is a source of income for many households, which in turn allows parents to send their children for secondary schooling which is not free in Bangladesh. Hence the results are aligned with what we the results found between secondary education and GDP where higher income is required to give incentive to parents to send their children to secondary schooling.

**Table 8:**

**Pairwise Granger Causality Tests between secondary education and rural credit**

Lags:1	F-statistic	Prob
Secondary education does not affect rural credit	0.02	0.90
Rural credit does not affect Secondary Education	5.71	0.03

**Fully modified OLS with Secondary Education as the dependant variable**

Variable	Coefficient	T-Statistics	Prob
Rural Credit	7.387391	1.94	0.08
Constant	9461090.	16.29	0.00

4.3 Tertiary Education

The analysis is finally continued with tertiary education. First with GDP, within two lags we found GDP influencing tertiary education and the effect is found to be positive and significant. This implies that economic growth would increase level of tertiary education. This could mean that tertiary education being very expensive is not affordable by the many. Hence increase in income would allow to access tertiary education.

Table 9:

**Pairwise Granger Causality Tests between tertiary education and GDP**

Lags:2	F-statistic	Prob
Tertiary education does not affect GDP	0.018	0.895
GDP does not affect Tertiary Education	5.709	0.034

**Fully modified OLS with Tertiary Education as the dependant variable**

Variable	Coefficient	T-Statistics	Prob
GDP	4.38E-06	11.36071	0.0000
Constant	-64660.53	-3.115906	0.0034

With inequality, the results are contrary to what we found with the other levels of education. Within one lag, inequality has an effect tertiary education and it is found to be positive and significant. This implies that if there is higher inequality, this would lead to more tertiary education. This could imply only the group of people at the higher end of the income group can have access to tertiary education.

Table 10:

**Pairwise Granger Causality Tests between tertiary education and Inequality**

Lags:1	F-statistic	Prob
Tertiary education does not affect Inequality	0.01	0.92
Inequality does not affect Tertiary Education	3.46	0.08

**Fully modified OLS with tertiary Education as the dependant variable**

Variable	Coefficient	T-Statistics	Prob
Inequality	2457.710	2.86	0.01
Constant	-70985.22	-2.48	0.02

Similar to primary and secondary education, tertiary education has a negative effect on fertility rate. Thus, all levels of education help to reduce the fertility rate. Thus, investing in all levels of education can be considered to be an important policy for population control of Bangladesh. Finally with rural credit, the results show that tertiary education has a positive significant effect on rural credit. The results are different from what we found for primary and secondary education. So attainment of tertiary education allows attracting rural credit. In most developing countries, access to credit is mostly centralized in the urban area. With increase in tertiary education in the rural area, the young and educated are more likely to attract and demand credit and make proper utilization of the credit. Hence tertiary education is very important to spread out the availability of formal credit to rural areas as well.

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**Table 11:**

**Pairwise Granger Causality Tests between tertiary education and fertility rate**

Lags:1	F-statistic	Prob
Tertiary education does not affect Fertility rate	24.108	0.000
Fertility rate does not affect Tertiary Education	0.0677	0.797

**Fully modified OLS with Fertility rate as the dependant variable**

Variable	Coefficient	T-Statistics	Prob
Tertiary education	-5.68E-06	-3.00	0.0053
Constant	4.735598	11.44	0.0000

**Table 12:**

**Pairwise Granger Causality Tests between tertiary education and rural credit**

Lags:2	F-statistic	Prob
Tertiary education does not affect rural credit	96.23	0.00
Rural credit does not affect Tertiary Education	1.83	0.21

**Fully modified OLS with Rural Credit as the dependant variable**

Variable	Coefficient	T-Statistics	Prob
Tertiary Education	0.386382	4.47	0.00

## 5. Conclusion

This paper studied the role of education for economic growth and other macroeconomic variables in the context of Bangladesh using time series data. The simple-minded exercise gives us considerable insights. Using disaggregated data for education (primary, secondary and tertiary), we find that higher primary education positively effects GDP with a lag of three years, however there is no casual effect running from GDP to primary education. With primary education made mostly free by the government, higher income through economic has no effect on primary education. However, increase in primary education can lead to higher economic growth. Such introduction is also good enough to increase inequality by increasing earning potential of student enrolled. Though, for secondary education, it is the other way around, higher GDP induces parents to send their kids to secondary education and though such training it increases the income potential of the students which is seen to contribute to higher inequality. Tertiary education positively affects GDP where investing in higher education leads to increase in income. But the relationship between inequality and tertiary enrollment is reversed and completely opposite to what it is found for primary and secondary education. From the results, it is seen that higher inequality increases tertiary enrollment which is explainable for tertiary education being expensive, it is only accessible to the group at the top of the income distribution.

This study also considered the effect of education on other development variables. For fertility rate, lower fertility increases primary education with one lag but after two or three years education affects fertility rate which implies that lower fertility induces parents the send their children to basic schooling and eventually with schooling and investment in education, it can aid in reducing unwanted fertility rates (Jiang & Hardee, 2014). However, for secondary and tertiary education enrollment uni-directionally reduces fertility rate where investing in

higher education reduces the fertility rate but the change in fertility rate has no influence on secondary and tertiary education enrolment.

This paper also has considered the influence on rural credit. Primary education has no role to play for attracting rural credit. For secondary education, rural credit has a uni-directional effect on secondary education within one lag and the effect is found to be positive where increase in rural credit increases income and instigates parents to send children for secondary schooling. And the result is completely reversed for tertiary education, where increase in tertiary education increases the possibility of acquiring more rural credit which is very insightful for any potential decentralization policies.

These apparently discrete findings tell us still little bit of education can buy a significant mileage in increasing GDP. Parents are mostly interested in education of their kids however often bearing educational expenses can be a problem for them. Since education has such high rate of return government can gradually strengthen its free primary education program and extend it towards secondary level and to tertiary level education. Other insights can also be derived by extending this study to investigating the effect of education on increasing wage potential which can be an interesting issue from micro perspective and from macro perspective if the government wants to fine tune its policy measures.

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