Understanding Poverty Across Nations: Panel and Case Studies

by

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I. Introduction

The World Bank characterizes poverty in absolute terms. Extreme poverty, as they define, is the percentage of the population living on less than $1.90 a day in 2011 purchasing power parity dollars. Global poverty alleviation has witnessed marked progress over the last few decades. The first Millennium Development Goal target – to reduce the global poverty rate of 1990 to half by 2015 – was attained in 2010, five years ahead of schedule (see Table 1). In 2015, the global share of the people living in extreme poverty was 10 percent (736 million), the lowest percentage ever recorded (World Bank Press Release, 2018). The figure was a decrease from 11 percent, or by 68 million, in 2013.

Although the World Bank has committed to reducing extreme poverty to less than three percent by 2030, the steady progress is disproportionate across regions. Two regions, (1) East Asia and Pacific and (2) Europe and Central Asia, have already achieved the 2030 target, whereas Sub-Saharan Africa will have nearly 9 out of 10 of the extremely poor by 2030. The number of poor in the region, in fact, was more than all other regions combined in 2015 (Joliffe & Lugo, 2018).

Scholars, thus, have examined several approaches to alleviate poverty in developing nations, such as economic growth, human capital, political institutions, and foreign aid (e.g., Acemoglu, D., & Robinson, J. A., 2012; Kheng, V., Sun, S. & Anwar, S., 2017; Wan, G., Wang, C., Yin, H., & Zhang, Y., 2018). Education is often envisaged as the primary instrument to reduce poverty. The World Bank has promulgated investment in people's knowledge and skills as a development strategy to alleviate poverty (King, 2011). Few studies, however, have analyzed the effect of education on poverty alleviation across countries. Education often is

considered under the bracket of human capital. Although there is substantial research investigating the relation of human capital with economic growth, the literature on how educational attainment alone influences poverty is scarce. Fewer empirical works have been done across nations using panel data.

The paper seeks to understand poverty across nations by analyzing the effect of educational attainment on poverty rate. Country-level panel dataset of educational attainment and poverty rate are employed utilizing univariate and multivariate linear OLS regression to draw the relationship. In what follows, the paper will (1) review the literature on human capital, educational expenditure, economic growth, and poverty, (2) explain the data and the statistical model used for the study, (3) analyze and discuss the results, and (4) present case studies to discuss dimensions of poverty that are not readily quantifiable.

II. Literature Review

Scholars have studied the relation of different aspects within education, such as educational attainment, human capital, and governmental education expenditure, with economic growth and poverty rate. In his study, Barro (2013) found that economic growth had a positive relationship with the average years of school attainment of adult males at the secondary and higher educational levels. The growth, however, was not significant with years of school attainment of males at primary levels, as was with females at the secondary and higher levels. The empirical analysis of growth was derived from an extended neoclassical growth framework in a panel of 100 countries observed from 1960 to 1995, in which human capital was a determinant of the growth rate of per capita output. The analysis stressed the educational component of human capital but also made a distinction between the quantity and quality of education. The quantity of education was measured by the years of attainment at various levels

using Barro and Lee's (2000) international data on educational attainment, and the quality of education was measured by the internationally comparable examinations. The results also showed that the science test score had a strong positive relationship with economic growth. Finally, although both quantity and quality of education contributed to positive subsequent economic growth, the school quality had a much more significant effect.

Similarly, Leoning (2004) in his growth-accounting framework on the effect of education on economic growth in Guatemala between 1951-2002 demonstrated that education explained about 50% of output growth during the period. His empirical study also concluded that an increase by one percentage point of average years of schooling would raise output by about 0.33 percent. The study utilized human capital augmented growth model by Mankiw et al. (1992) in which human capital was an independent factor of production in the Cobb-Douglas production function. Similar to the literature mentioned above, Leoning also utilized the error-correction model, such as the Dickey-Fuller Test, for unit roots. Average years of schooling retrieved from Barro and Lee's (2001) and Cohen and Soto's (2001) educational attainment data was as the measure of human capital in the study. Also, the primary data sources were an amalgamation of Banco de Guatemala, Ministry of Education (MINEDUC), and UNESCO.

Dao (2007) examined the effect of the components of human capital on the extent of poverty and income distribution in developing countries using two different samples of developing economies. The first sample of 40 developing nations found out that the fraction of the population below the poverty line is linearly correlated with gender parity ratio in school, the prevalence of child malnutrition, per capita gross national income (PGNI), the maternal mortality rate, and the percentage of births attended by skilled health staff. The conclusion was derived after regressing the poverty rate with the aforementioned explanatory variables. Likewise, in

another sample of 35 developing countries, income inequality depended on the same aforementioned explanatory variables plus the infant mortality rate and the primary school completion rate. Both samples utilized the dataset from the World Development Report, 2006 and 2007, of developing countries notably from Africa, South East Asia, South Asia, and South America. Likewise, the equation for both analyses were multivariate linear regressions with OLS estimation. Finally, because of the multicollinearity of independent variables, the regression also accounted for interaction terms, such as sex parity and PGNI, yielding more robust and statistically significant results.

In another study of the effect of education on poverty reduction in Pakistan, Awan et al. (2011) concluded that experience and educational achievement negatively correlated with poverty rate and that higher levels of education decreased the probability of a person being poor. Educational achievement measured different levels of education, and experience variable measured the years of schooling. The study derived from the dataset the 1998-99 and 2001-02 Household Integrated Economic Survey (HIES) conducted by Federal Bureau of Statistics (FBS) of Pakistan, and the results above were consistent with both the years. Awan et al. categorized the monthly income of individuals in four quintiles where the individuals in the lowest quintile were considered poor and the other three quintiles as non-poor. Finally, the study used logistic regression with the probability of an individual being poor as the dependent variable and different levels of educational attainment, experience, and gender of employed individuals (employers, self-employed, wage earners, and unpaid family workers) as explanatory variables.

De Silva and Sumarto (2015) studied the effect of both health and education capital on economic growth and poverty on sub-national (district) level in Indonesia and found that the increase in education capital was associated with a lower level of poverty within sampled

districts. Three variables captured the education capital at the district level: gross secondary school enrollment ratio, share of population with secondary education, and years of education. Similarly, health capital was an aggregate production function of the common causes of poor health: immunization rate, skilled birth attendance, incidence of self-medication, and prevalence of water-borne diseases. The study used the well-established Neoclassical Solow model but added Islam's (1995) model to include human capital in determining economic growth productivity. The Cobb-Douglas function presented that higher physical investment and human capital will increase the growth rate of output per capita, and when depreciation and technological progress are adjusted, a higher labor force growth is expected to hurt per capita growth in output. Also noteworthy was the positive correlation between the poor immunization coverage and the water-borne diseases and poverty rate. The data study's data covered about 300 Indonesian districts for the period 2001 to 2012. Moreover, although the primary source of data was the National Socioeconomic Survey of Indonesia, the dataset was a consolidation of the World Bank and several official sources.

Although not directly studying poverty, Mallick, Das, and Pradhan (2016) investigated the dynamics between expenditure on education and economic growth in 14 major Asian countries using balanced panel data from 1973 to 2012. Data were collected from the World Development Indicators (WDI), World Bank, and the selection of 14 countries was subject to availability of data. The study used GDP to measure economic growth as a function of public expenditure on education. The Pedroni cointegration test revealed a long-run equilibrium relationship between expenditure on education and economic growth in all nations. The fully modified OLS (FMOLS) results, likewise, suggested a positive and statistically significant effect of education expenditure on the economic development of all regressed economies. Furthermore,

the panel Granger causality test found a unidirectional causal relationship running from economic growth to education expenditure in both short- and long-run. However, the expenditure on education only caused economic growth in the long-run in all countries.

In addition, Islam et al. (2007), similarly, analyzed the relationship between education and GDP growth in Bangladesh between 1976 to 2003 using multivariate causality analysis and found a bidirectional causality running between real GDP and education. Acquiring the dataset from Bangladesh Bureau of Statistics, the researchers used annual time series data of real GDP and annual education expenditure during the period 1976 to 2003 and also included capital and labor of Bangladesh in their cointegration and causality test. The empirical study used a vector autoregressive (VAR) model and vector error correction model (VECM) and consisted of the unit root tests, the cointegration test, and the Granger causality tests.

Idress and Muhammad (2013), similarly, also examined the long-term effect of public education expenditures on economic growth in both developed and developing countries. The heterogeneous panel data analysis used GDP and education expenditure data of 14 countries over 17 years from 1990 to 2006, of which seven were G-7 nations, and the remaining were developing countries. The data were collected from secondary sources, including various publications by International Agencies. The econometric model used economic growth measured in GDP as a function of total public expenditure in the education sector. The applied panel unit root tests showed that the variables were non-stationary in levels and stationary in first difference. Authors used Kao and Pedroni's Residual-Based Panel Cointegration Test to obtain the long-run relationship of variables. Finally, they found that a 1 dollar increase in public education expenditures brought 20.85 dollars increased in GDP in general. However, the education parameters after the application of Fully Modified Ordinary Least Squares found that

public education expenditures had a more significant effect on economic growth in developing countries than in developed countries. One dollar increase in public education expenditures brought an increase of 27.29 dollars in the GDP of developing countries as compared to 21.85 dollars in the GDP of developed countries. The result explains the catch-up effect in developing countries because they have higher marginal productivity in human capital formation than developed countries do.

In sum, previous studies suggest that increased educational attainment or educational expenditure results in higher economic growth and decreased poverty rate. Educated individuals have more employment opportunities and can earn higher wages, which drives long-term inclusive economic growth and reduces the poverty rate in an economy. The bulk of research, however, measure the economic growth as an outcome, not poverty rate. In cases where poverty rate was the response variable, such as Islam et al. (2007) and De Silva and Sumarto (2015), the scale of the study was on a national level, and not across countries. Dao (2007) employs country-level data to draw the relationship between human capital and poverty. However, it reveals little about the effect of educational attainment alone on poverty rate.

III. Data Sources and Description

The current study examines the effect of educational attainment on poverty rate via an OLS regression with country-level panel data. The project builds on Barro & Lee's (v2.2, June 2018) educational attainment dataset from 1950–2010. The dataset consists of educational attainment data for 146 countries in 5-year intervals disaggregated by sex for the period. It also provides data on the distribution of educational attainment of the adult population over the age of 15 and 25 by sex at seven different levels of schooling – no formal education, incomplete primary, complete primary, incomplete secondary, complete secondary, incomplete tertiary, and

complete tertiary. The age groups are further distributed in 5-year intervals for each measured year, and the total population is also measured (in 1000s) for the corresponding age group. Furthermore, the average years of schooling at all levels – primary, secondary, and tertiary – including the total average year of schooling are measured for each country. The dataset, in the end, classifies each country either by geographical region or by the level of the economy.

The dataset for the study is composed of data for the adult population over the age of 15. The study, similarly, utilizes three different categories of educational attainment variables from Barro & Lee's country-level panel dataset: average years of total schooling, total education in each level, and educational enrollment and completion in each level.

Average years of total schooling measures the average number of years an individual of the sampled nation went to school. Barro and Lee's dataset had a total of 1898 data points of average years of total schooling across countries and over time, and table 2 shows the descriptive statistics of the variable. On average over the years, as table 2 indicates, an individual attained school for 5.45 years with a standard deviation of 3.18 years and a median of 5.2 years. The figure is a steady progress to years of schooling because, in 1950, an individual only went to school for only ~3 years on average, whereas, by 2010, an individual on average went to school for ~8 years.

Total education refers to the percentage of the population who were either enrolled in or completed each level of education – primary, secondary, and tertiary. On average, 34.6% of the population from sampled nations attained primary education, and the median was 33.0%. Similarly, the standard deviation of the primary education level was 19.7%. The percentage of primary education attendees, unfortunately, has decreased over the years. 25.0% of the global population attended primary education in 2010, a significant decrease from 38.0% in 1950.

Secondary education also has a median of 23.3% across nations and years and an average of 27.2% with a standard deviation of 20.6%. Unlike primary education, secondary education, however, has witnessed remarkable progress. Only 9.9% of the population attained secondary education in 1950, but 46.5% did in 2010. Finally, a marginal population of 6.4% on average attained tertiary education, and the statistic is heavily skewed to the right as the median is only 3.33%. The figure above also fluctuates significantly as the standard deviation (7.7%) is greater than the mean. That said, noteworthy is the progress of the tertiary education level. 13.77% of the total population attained tertiary education in 2010, and the number is an increase from only 1.72% in 1950.

Total education, on the flip side, also shows the percentage of the population who did not have formal education or who did not go to school. The data from the observed nations across time show that an average of 31.8% of the population had no formal education with a standard deviation of 28.9. The median value of 22.7% indicates that the data is concentrated on the right. In Barro and Lee's dataset, there has been an instance where 99.6% of the population (Yemen in 1950) who did not attend school, and on the contrary, also 100% of the population who attended school (Lithuania in 2010).

The third category to measure educational attainment differentiates, in each level of education, the share of the population who either completed or enrolled in the level. Incomplete primary and complete primary education, for example, make up the total population of primary education attendees, and the divide between the two is relatively even. Of 34.6% of the global population who attended primary education on average, only 18.5% completed the level; thus, 16.1% did not. Likewise, the spread between the some primary and completed primary level is even as well, as the standard deviation is 13.6% and 13.7% respectively. The distinction,

however, is the decreasing percentage of the population who have incomplete primary. 20% of the population failed to complete the primary level in 1950, and the number reduced to 9.42% in 2010. Similarly, complete secondary and incomplete secondary level also have equal share among the population who enroll for secondary level. 14.1% of the population on average completed the level of 27.2% who attained secondary education across nations and over time. 13.1%, on the other hand, only enrolled at the secondary level. Over the years, although the percentage of the population who have incomplete secondary education has increased, more significantly has increased the population who completed the level. 19.31% of the population had incomplete secondary education in 2010, a remarkable increase from 5.7% back in 1950. However, 27.2% of the population completed the secondary level, and the figure is an increase from 4.18% in 1950. In the end, a small portion of the population attain tertiary education, let alone complete the level. Of an average of 6.4% who attained tertiary education, only 2.76% completed the level. Unlike secondary education, both complete and incomplete tertiary level have made steady progress over time. In 2010, 5.7% had some tertiary education while 13.8% completed the level. The figures are a constant increase from 0.8% and 1.7% in 1950 respectively.

The three categories are employed because they each give a distinct impression of educational attainment. They will help understand whether years of education or levels of education and weighs more to alleviate poverty. Moreover, each level of education can further be differentiated by completion and enrollment. The two categories – total education and educational enrollment and completion – run into issues of perfect multicollinearity because the sum of no formal education, primary education, secondary education, and tertiary education

equals 100%. Both sets of educational attainment, therefore, exclude no formal education to reduce collinearity among explanatory variables.

The study derives the dataset for the poverty rate of 195 countries from the World Bank's poverty headcount ratio at $1.90 a day (2011 PPP) for the period 1977–2017. Poverty headcount ratio is the percentage of population living on less than $1.90 a day at 2011 international prices. Poverty rate for individual countries cannot be compared with earlier editions of poverty rates due to the revisions in PPP exchange rates (World Bank, 2018). The database was retrieved from World Development Indicators (WDI) and measured the poverty rate in 1-year intervals. In addition to the individual countries, the dataset also includes the poverty rate by geographical regions, such as South Asia, and by the level of economy. Furthermore, it also differentiates each region by the income level, such as Sub-Saharan Africa and Sub-Saharan Africa (excluding high income).

Although the poverty rate of each country, if available, is measured every year, the data is very inconsistent and sporadic. The selection of the countries, therefore, are subject to the availability of the data. Similarly, only the poverty rate data of every half-decade are applicable because Barro & Lee's dataset only consists of the educational attainment data in 5-year intervals, and the poverty rate is regressed with the data. In all cases, the poverty rate is calculated as the average of the actual year and the neighboring four years when the data is available. The neighboring years are considered to be two years before and after the actual year. For example, if the poverty rate of Nepal in 1980 is not available, but it is available for the neighboring years – 1978, 1979 and 1982, the poverty rate for 1980 is calculated as the mean of those three years.

The average value of the actual year and neighboring four years can proximate the poverty rate of the actual year because poverty rate generally does not change rapidly. The global poverty rate in 1990, as shown in Table 1, was 24.9%. Although the first Millennium Development Goals (MDGs) target – to halve the 1990 global poverty rate by 2015 – was achieved in 2010, the global poverty rate in 2010 was 11.7%. This means the decrease in the poverty rate is only 13.3% in 20 years or an average of 0.7% a year.

Similarly, to illustrate the sluggish nature of poverty rate on a national level, Costa Rica, for instance, had a poverty rate of 8% in 1993, 6.6% in 1994, 6.9% in 1995, 8% in 1996, and 6.5% in 1997 (World Bank, 2018). The change in the poverty rate during the five years, thus, was only 1.5%, or ~1.1% a year. Likewise, the poverty rate in Peru was 16.7%, 17.6%, 16.4%, 17.1%, and 15.1% in 1998, 1999, 2000, 2001, and 2002 respectively (World Bank, 2018). Poverty rate only changed by 1.6% over the five years.

The average across five years also ensures that the dataset does not double count any single year as a neighboring year of two different years in the 5-year interval. For example, the neighboring four years of 1975 are 1973, 1974, 1976, and 1977. Similarly, 1980 has neighboring years 1978, 1979, 1981, and 1982. No single year from 1973 to 1982, therefore, overlaps for the sampled year 1975 and 1980.

Table 2 shows the descriptive statistics of poverty rate after the data were compiled. The global poverty rate, on average over the years, was 17.6% with a spread (standard deviation) of 22.8%. The highest extreme poverty rate ever recorded was 94.1% (the Democratic Republic of the Congo in 2005), and several western European nations, such as France and Germany, had the lowest possible extreme poverty rate (0%) in 2010.

In addition to the Barro & Lee's educational attainment and the poverty rate dataset, the study also employs several control variables; Barro (1997) suggested the selection of such variables, and they are also retrieved from World Development Indicators database, the World Bank. Following are the control variables used for the study:

Fertility rate. Fertility rate measures the weighted average number of children a woman would bear if she were to live till the end of her childbearing years and bear children by age-specific fertility rates of the specified year. The dataset provides data from 140 countries for the period 1960–2017 measured in 5-year intervals with a total sample size of 1544. Table 2 shows that a woman gave birth to an average of ~four babies over the years. The fertility rate also has reduced from ~five in 1960 to ~3 in 2010.

GDP per capita (constant 2010 US dollars). GDP per capita is calculated as the gross domestic product divided by mid-year population. It is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. The calculation assumes no depreciation of fabricated assets or no depletion and degradation of natural resources. Data are in constant 2010 US dollars; therefore, the natural logarithm (ln) of the GDP per capita is used for calculation purposes. Similar to the fertility rate, the dataset employs data from 140 nations for every half-decade period between 1960–2017 with a total sample size of 1544.

The average value of ln(GDP per capita), as demonstrated in Table 2, is 8.20, meaning an average individual from the global population from 1960-2010 made $e^{8.20} \approx 3636$ dollars in 2010 US dollars. The per capita earning is a substantial increase from 7.59 or ~1990 dollars in 1960 to 8.61 or ~5468 dollars in 2010.

Foreign direct investment (FDI). Foreign direct investment (FDI) is the net inflows of investment from foreign investors to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. The time series data, expressed in percentages, shows the ratio of net inflows of FDI in the reporting economy in the year to GDP. It includes data from 140 nations for the period 1970 to 2010 in 5-year intervals. The data, however, is unavailable for every nation during the sampled year; thus, the total sample size is 998. The net inflows of investment also have negative values when a nation has been an investor rather than a recipient. That said, the average FDI over the years is 3.42% relative to its GDP. In all measured years, the average FDI has had a positive value, meaning a sampled nation, on average, has received foreign investment more than it has invested in foreign nations with respect to its GDP. The average FDI, though, has a high spread as the average standard deviation is 13.4 from 1970–2010.

Educational Expenditure. General government educational expenditure measures the ratio of the nation's educational expenditure (current, capital, and transfers) in the year to the GDP, expressed as percentages. The government is usually referred to as local, regional, and central governments. Moreover, the expenditure also includes funding from international sources to the recipient government. The educational expenditure dataset consists of data from 140 nations from 1970–2010 measured in 5-year intervals with a total of 584 data points. Education only seems to receive a small portion of government spending because the average educational expenditure, as a percentage of GDP, across sampled nations and time, is only 4.3%. The figure has not made much of the progress in history as well. The standard deviation of the expenditure is 1.76, and a nation spent an average of 3.6% of its GDP on education in 1970, and 4.3% of its GDP in 2010.

Gender Parity Index (GPI). Gender Parity Index is the gross enrollment ratio of girls to boys in primary and secondary education levels in both public and private schools. The ratio indicates the number of girls enrolled to every 100 boys enrolled in the year. Like educational expenditure, GPI employs data from 140 nations from 1970–2010 – a total sample size of 764. Over the years, to every 100 boys, ~93 girls have enrolled in both primary and secondary education on average, and the spread (standard deviation) of the average is 15. The figure is also a steady improvement from ~88 in 1970 to ~98 in 2010. There have been instances where more girls have attained primary and secondary education than boys (Lesotho in 1970 with GPI of ~146), and the lowest GPI ever recorded was ~17 (Afghanistan in 1970).

Personal Remittances Received. Personal remittances signify personal transfers and compensation of employees to the recipient nation. Personal transfers consist of all current transfers from resident and nonresident individuals in cash or kind to resident households. Likewise, compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities. The data are the weighted average personal remittances received as percentages of GDP in the year. The dataset comprises of data from 140 nations throughout 1970–2010 with a total of 789 data points. Global population has witnessed personal remittances as an increasing share of its GDP. A nation, on average, only received 0.9% of its GDP as personal remittances in 1970, and the number increased to 4.4% in 2010, making an average of 3.7% over the years. The standard deviation of 12.2 shows that some nations are more reliant on personal remittances than others.

Trade Openness. Trade openness measures the sum of the absolute value of imports and exports of goods and services within the year measured a share of GDP (in percentages). The

trade dataset employs a robust data of 140 nations dating from 1960 to 2010 measured every half-decade – a total sample size of 1246. Owing to the globalization, the ratio of trade to GDP, on average, is 72.3% during the sampled years, and the volume of trade has only been expanding. The ratio of trade to GDP was 49.6% in 1960, and the number augmented to 89.9% in 2010. Some nations have had trade more than four times as many as their GDP, such as Singapore in 2005 with trade, as % of GDP, of 422%. And some nations also have had little to no trade, as % of GDP, such as Iraq in 1995 with 0.02%.

In the end, the poverty rate is the limiting factor in terms of data availability because its data are scarce. The total data points available across countries and time are 404 (see Table 2), and the earliest data available for poverty rate is in 1975 (see Table 1). The number of observations is not proportionately distributed among nations as well. The dataset for this study built on Baro and Lee's panel data of 146 countries; however, the poverty dataset only had data for 108 nations. Thus, the regression analysis excluded 38 countries because of unavailability of data. Similarly, Baro and Lee's dataset is only available in a 5-year interval. The project's dataset, as a result, is an unbalanced panel data of 108 nations for the period 1975 to 2010 in a 5-year range with the maximum sample size of 404.

IV. Methodology

This project employs univariate and multivariate linear OLS regression to assess the relationship between educational attainment and poverty rate (see Table 4 and 5).

Univariate Regression. The univariate regression is a simple linear regression of each of the explanatory variables against poverty rate:

$$p_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it} \qquad (1)$$

where,

p_{it} is the poverty rate of country i in year t

X_{it} is the explanatory variable of the nation i in year t

ε_{it} is the idiosyncratic error or observation-specific zero-mean random-error term

The study employs the ordinary least squares method to find parameters β_0 and β_1. Country fixed effects and time fixed effects are also used subsequently to account for country-specific and year-specific trends:

$$p_{it} = \beta_0 + \beta_1 X_{it} + u_i + \varepsilon_{it} \quad (2)$$

where,

u_i is the country fixed effects in country i

And,

$$p_{it} = \beta_0 + \beta_1 X_{it} + u_i + v_t + \varepsilon_{it} \quad (3)$$

where,

v_t is the time/year fixed effects in year t

Multivariate Regression. The multivariate regression includes the poverty rate of the country i in the corresponding year t as the response variable and educational attainment as the explanatory variable:

$$p_{it} = \beta_0 + \beta_1 EA_{it} + \varepsilon_{it} \quad (4)$$

where,

p_{it} is the poverty rate of country i in year t

EA_{it} is the educational attainment of the nation i in year t

ε_{it} is the idiosyncratic error or observation-specific zero-mean random-error term.

Because EA_{it} has three different sets of categories, the equation (4) regresses poverty rate with each set of educational attainment variables. Moreover, as with univariate regression, the study also adds the statistical model to the equation (4) – country fixed effects and time/year fixed effects model – to further reduce the probability that a relationship is driven by an omitted or "latent" variable:

$$p_{it} = \beta_0 + \beta_1 EA_{it} + u_i + \varepsilon_{it} \quad (5)$$

$$p_{it} = \beta_0 + \beta_1 EA_{it} + u_i + v_t + \varepsilon_{it} \quad (6)$$

The control variables are then included to produce more robust and precise results as they account for omitted variable bias:

$$p_{it} = \beta_0 + \beta_1 EA_{it} + \beta_2 CV_{it} + \varepsilon_{it} \quad (7)$$

The fixed effects follow the equation (7) as well:

$$p_{it} = \beta_0 + \beta_1 EA_{it} + \beta_2 CV_{it} + u_i + \varepsilon_{it} \quad (8)$$

$$p_{it} = \beta_0 + \beta_1 EA_{it} + \beta_2 CV_{it} + u_i + v_t + \varepsilon_{it} \quad (9)$$

where,

u_i is the country fixed effects in country i

v_t is the time/year fixed effects in year t

In each measure of educational attainment, the regression analysis employs four sets of regressions – only explanatory variables, explanatory variables with control variables, explanatory variables with control variables (educational expenditure excluded), explanatory variables with control variables (educational expenditure and gender parity index excluded). The first set unearths the relation and statistical significance of explanatory variables. In the second set, the application of control variables tests if they are still statistically significant and how their parameters change. Control variables, however, shrink the number of observations in the

regression. The sample size in equation 4 of Table 5, for example, reduces to 175 from 404 in equation 3 – a decrease of ~57% – after all the control variables are applied.

Among the control variables, educational expenditure and gender parity index have the lowest sample size – 584 and 764 respectively. Therefore, they are excluded successively, primarily to increase the number of observations and to discern the changes in the statistical significance and parameters of explanatory variables. After their omission, the total observations increased to 259 and 357 respectively (see equation 7, 10, Table 5), and the regression follows similar order of equation (7), (8), and (9).

Within each set of regressions, country fixed effects and year fixed effects are also applied to account for trends unique to countries and years. They do so by introducing dummies across cross-sectional as well as time units and pick up any variation in the outcomes that happens across different countries and over time which are not attributed to any other explanatory variables. The results of fixed effects mean that the statistically significant results are robust to specific factors associated with individual nations and individual years. As with the previous regression, the equations mentioned above also regress the poverty rate with each of the three measures of education attainment variables and utilizes ordinary least square method to minimize the random-error term, ε_{it}.

Prior Expectations for Signs of Parameters. Educational attainment often is touted as a catalyst to pull families and communities out of the vicious circle of poverty (e.g., Awan et al. (2011); Barro (2013); Banerjee & Duflo (2015); De Silva & Sumarto (2015)). It is associated with literacy, increased earnings, economic and gender equity, and economic growth, all of which can help alleviate poverty. Thus, all three categories of educational attainment are expected to have an inverse relationship with poverty rate. The study hypothesizes that the signs

of parameters β_1 to be negative also because the excluded category is "no formal education" and these parameters are measured relative to the excluded group. The statistical significance of each category, however, is unclear. Equally uncertain is the rate of return of each level of education on poverty rate.

Similarly, among the control variables, the study expects fertility rate to have a positive relationship with poverty rate. A poor family relies on the labor force to generate income, and higher the fertility rate, higher the number of workers in a family. The correlation matrix in table 3 also shows that the poverty rate is positively correlated with a strong correlation coefficient (r) of 0.82. Also, gender parity index (GPI) is also hypothesized to have a negative relationship with poverty rate. As showed by Dao's (2007) work, poverty line is linearly correlated with gender parity ratio in school in developing countries. The correlation coefficient between GPI and poverty rate in table 3 also suggests the same. GDP per capita is arguably the most potent variable to alleviate poverty. The increase in per capita income (or economic growth) indicates higher income for individuals, effectively pulling them out of poverty. By the same logic, the paper also posits personal remittances to have an inverse relation with poverty rate. GDP per capita as shown in Table 3 has a negative association with poverty rate (-0.75), however, personal remittances received has slightly positive (0.01). The regression analysis will further pronounce the relation between poverty rate and control variables mentioned above.

Several scholars have also demonstrated the statistically significant positive effect of educational expenditure on economic growth (e.g., Mallick, Das, & Pradhan (2016); Islam et al. (2007); Idress and Muhammad (2013)). The study, therefore, expects the similar effect of educational expenditure on poverty rate as well. The r-value of -0.36 in the correlation matrix (Table 3) also endorses the hypothesis. Furthermore, although trade might have a latent effect,

the direct relationship between trade and poverty rate are hard to draw; thus, the project bases its expectation on the correlation coefficient shown in Table 3 and expects inverse relation between the two variables. Finally, foreign direct investment (FDI) has had conflicting results on the poverty rate in the past. A narrative in proposition argues that FDI aid jump starts the economy because it invests in development projects, creating ripple effects along the way, such as increased employment and infrastructure. A conflicting narrative, however, claims that FDI increases foreign dependence, causes corruption, and crowds out financial and social capital of the economy. The study, thus, expects FDI to have a negative relation with poverty rate, however, once the fixed effects are applied, it might have little to no effect, and the parameters might change the sign as well.

V. Results

Univariate Regression. Table 4 presents the results of univariate regression of poverty rate and each of the educational attainment variables and the control variables. The statistical significance of any variable discussed below is at $\alpha = 5\%$ level unless indicated otherwise.

The no schooling variable is positively associated and statistically significant with poverty rate. Higher the share of population with no formal education, higher the poverty rate of the nation which confirms the prior expectation. And the relationship is statistically significant before and after fixed effects. Also noteworthy is the strong coefficient of determination of the univariate regression after country and year fixed effects *($N = 404$, $R^2 = .44$)*.

The parameters of primary education are mixed, and so are their statistical significances. With country and year fixed effects, total primary education is inversely related to poverty rate and the slope coefficient is statistically significant. This affirms the study's expectation that the increased percentage of population with primary education will reduce poverty rate. However,

the positive sign of parameter when no fixed effects are used dilutes our hypothesis. The parameters of primary completed level also swing from positive to negative after fixed effects although none of them are statistically significant. Some primary level trails a similar pattern except only the parameter is statistically significant when no fixed effects are applied. The primary education variables, in the end, have a bleak relation with poverty rate as the value of R^2 runs from .00 to 0.07.

On the other hand, all variables of secondary education (total, incomplete, and complete) are statistically significant and negatively related to poverty rate until time fixed effects are applied. The slope coefficient of secondary completed level also changed to positive after time fixed effects were applied. Although the results cannot account for time-specific trends, they suggest that secondary education has a more significant effect on poverty rate than primary education.

Tertiary education poses a dilemma to the prior expectations as well. Total tertiary education and tertiary completed are statistically significant with poverty rate before and after fixed effects are applied. However, all the parameters of tertiary level (total education, incomplete, and complete education) change to positive after time fixed effects are employed. Higher tertiary education is now associated with higher rates of poverty, which contradicts the study's original hypothesis. The switch in the signs of parameter can indicate significant heterogeneity across countries which dominate explaining differences across countries and not 5-year fluctuations in educational attainment within countries.

Similarly, average years of total schooling also has a negative relation with the poverty rate, and the parameters are statistically significant until the year fixed effects are applied. The result is in accord with the original expectation, however, after year fixed effects, the slope

coefficient not only changes to negative, but R^2 also decreases from .51 to .00. This is to say after year fixed effects, average years of total schooling explains for none of the variations in the poverty rate around its mean.

Fertility rate, also, has a robust positive relation with poverty rate as all parameters are statistically significant with and without fixed effects, and the coefficient of determination is 0.44 after country and time fixed effects. The results agree with the hypothesis that a nation with a high poverty rate is likely to have a fertility rate as well.

Of all control variables, GPD per capita has the strongest relation with poverty rate. Not only the magnitudes of slope coefficients but the coefficient of determination is also the highest with a value of .58 both before and after fixed effects. The strong negative association between GDP per capita and the poverty rate validate the prior expectation that it is arguably the most potent variable to alleviate poverty.

Foreign Direct Investment (FDI), on the flip side, shares no statistically significant relation with poverty rate. The signs of parameters, however, indicate a negative association between the variables. The value of R^2 is weak as well (0.05 after country and year fixed effects).

As much of the literature has supported, increase in educational expenditure decreases poverty rate, and the relationship is statistically significant before and after fixed effects. For example, after country and year fixed effects, educational expenditure explains for the 9% of the variability poverty rate.

Similar to educational expenditure, gender parity index also has a statistically significant inverse relationship with poverty, and the univariate relationship is robust to the country and year fixed effects. This implies that female education and gender equity in the school are paramount to alleviate poverty.

Personal remittances received, additionally, is only statistically significant after fixed effects are applied. The parameters also changed from positive-not significant to negative-significant, which endorse the original hypothesis that additional cash does help alleviate poverty. Despite the significant relationship, the value of R^2 is close to 0 (.01 with country fixed effects and .02 with country and year fixed effects).

Finally, trade (% of GDP) has a negative relation with poverty rate, but the relationship is only statistically significant until when year fixed effects are applied. After year fixed effects, the parameter changes from negative to positive as well. In closing, increased trade is associated with a decrease in poverty; however, this may reflect time-specific factors.

Multivariate Regression. Table 5, 6, and 7 show the results of the multivariate regression of poverty rate with three different sets of educational attainment variables. In each measure of educational attainment, as with univariate regression, this regression analysis employs four sets of regressions – explanatory variables, explanatory variables with control variables, explanatory variables with control variables (educational expenditure excluded), explanatory variables with control variables (educational expenditure and gender parity index (GPI) excluded). The purpose of using four sets in multivariate regression is the same as in univariate regression. Explanatory variables allow to analyze their statistical significance, control variables test how their parameters change and if they are still statistically significant, and exclusion of educational expenditure and GPI increase the number of observations. The statistical significance of any variable discussed below, unless indicated otherwise, is at $\alpha = 5\%$ level.

Table 5 shows the results using average years of total schooling to measure educational attainment. The average years of total schooling seem to be statistically significant with the

poverty rate in univariate regression until time fixed effects are applied. Equation 3 in the table shows the dramatic change of coefficient of determination (R^2), from 0.51 to 0.00, after time fixed effects, and the sign of slope coefficient turns positive as well. A possible interpretation could be the bias was from unobserved variables which were constant across countries but vary over time. Once the control variables are introduced, none of the slope coefficients of average years of total schooling are statistically significant, with and without fixed effects, and their relation with poverty rate fluctuates between positive and negative. The pattern is also true for the control variables – foreign direct investment (FDI) and trade.

Fertility rate seems to be statistically significant with poverty rate and show positive relation in equation 4 and 7; however, after country and year fixed effects are introduced, the slope coefficient is no longer statistically significant and changes from positive to negative. After the regression eliminates the gender parity index (GPI) from control variables group, the fertility rate is statistically significant again without and with fixed effects. The reason could be the following: fertility rate is highly correlated with GPI, *(N = 175, r = -0.72)*. Once females are not allowed to attend school, they are compelled to marry at an early age, increasing their child-bearing tendency. And a poor nation will have a high fertility rate because children are a source of labor, thus higher the number of children, higher the stream of income. The finding reiterates the significance of education, female education in particular, which both educational expenditure and GPI also suggest. Educational expenditure is statistically significant with poverty rate after country and time fixed effects are applied, and so is GPI with and without fixed effects. Equation 6 shows that a percentage increase in education expenditure as a share of the nation's GDP will decrease the poverty rate by ~1.75 percentage. Similarly, equation 9 demonstrates that a percentage increase on female to male students ratio decreases the poverty rate by ~0.5 percent.

Personal remittances and GDP per capita (or economic growth) are fundamental to poverty alleviation as their statistically significant slope coefficients signify. Both control variables are statistically significant with and without fixed effects, but the higher magnitude of the coefficient of GDP per capita suggests it has more significant effect to reduce poverty. Nonetheless, they are both associated with additional income or cash, potentially creating income effect and lifting individuals out of poverty.

Table 6 provides the results for total education in each level as a measure of educational attainment. The total education differentiates different levels of educational attainment and their statistical significance with poverty rate. When no control variables are included, primary education seems to be more significant than secondary and tertiary education as its slope coefficient is statistically significant with and without fixed effects (see equation 1, 2, and 3, Table 6). Although significant otherwise, secondary and tertiary education are not statistically significant once time fixed effects are applied. After control variables are added to the regression, primary education continues to be statistically significant and shows negative relation with poverty rate. The equation 10, 11, and 12, show that secondary education, although shows negative relation with poverty rate, is significant with country fixed effects after GPI is removed and not with year fixed effects.

Tertiary education, on the other hand, does not seem to be statistically significant after fixed effects are applied. In fact, contrary to intuition, the tertiary education changes its sign, from negative to positive, in equation 11 and 12 although the coefficients are not statistically significant. A possible reason to this shift could be that the labor market in some economies might not be strong enough that the supply of educated workforce outweighs the demand for them, driving unemployment rate and creating deadweight loss to the economy.

The above results imply that primary education is more significant to alleviate poverty alleviation than is secondary or tertiary education. Primary education prepares a student with necessary skills, such as writing, reading, and numeracy, which has a more positive effect on marginalized populations' incomes than does secondary education where the emphasis is on a wider array of education and coursework. The rate of return is higher in low-income nations than in higher-income nations.

Furthermore, the effect of primary education on poverty alleviation is gendered as well. Gender parity index (GPI) is negatively related and statistically significant with poverty rate as in Table 5 after country fixed effects and time fixed effects are applied. If all women had primary education, maternal deaths would fall by two-thirds, and child marriages and child mortality could fall by a sixth, saving almost a million lives each year (UNESCO, 2018). The magnitude of the parameter, however, is not as strong. The equation 9 in table 6 indicates that a percentage increase in female to male student ratio reduces the poverty rate by ~0.38% as compared to ~0.5% decrease in equation 9 in table 5.

Among control variables, the effect of fertility rate on the poverty rate is not as robust as in Table 5. The equation 7, 8, and 9 depict that it is statistically significant before and after fixed effects after the regression eliminates educational expenditure. Interestingly, the signs of the slope coefficient also switch from positive to negative. This is to say the higher fertility rate is associated with lower rates of poverty after differences across countries and years are accounted for. The following could be an explanation of the negative relation between fertility rate and poverty rate: Higher fertility rate results in an increased number of children in a household. Children are considered a source of labor, thus higher the number of children, higher the streams of income, helping reduce poverty.

Statistically significant are GDP per capita and personal remittances as well. Both are statistically significant before and after fixed effects, and their inverse relationship with poverty rate is consistent throughout the equations even after control variables – educational expenditure and GPI – are excluded. This significance demonstrates how robust the two variables are, and their slope coefficients could be interpreted the same as in Table 5. Higher GDP per capita and personal remittances entail more economic opportunities and increased cash, which lifting families out of poverty.

The coefficients of FDI and trade, on the other hand, suggest that they do not have any effect on the poverty rate. The trend is similar to coefficients from equation 5. Their slope coefficients are close to zero, they are not statistically significant on any equation, and they sporadically change their signs.

Finally, unlike equation 6 in Table 5, educational expenditure in Table 6 is not statistically significant with the poverty rate after year fixed effects are applied. That said, it is statistically significant with country fixed effects. In sum, increased government spending on education is associated with decreased poverty rate; however, the relation does not stand when the regression accounts for time-specific trends.

Table 7 presents results using total education enrollment and completion as a category of educational attainment. The total education enrollment and completion differentiates between the share of population who only enrolled in the level of education but did not finish and who completed the level. Table 7 shows the results of the differentiation. In equation 1, 2, and 3, only primary education is statistically significant in both enrollment and completion categories. Secondary completed and tertiary completed level fail to be significant with country and time fixed effects although they are with no fixed effects or only country fixed effects. Moreover,

some tertiary level showed a positive relation with poverty rate while tertiary completed level did the opposite. The slope coefficients follow similar patterns once the regression includes the control variables. Primary completed level stands out the most (see equation 8, 9, 10, 11, 12, Table 5). And some primary is statistically significant once the gender parity index is unaccounted for. The results reiterate the results from Table 6 – the crucial nature of primary education to alleviate poverty. Furthermore, although some secondary and secondary completed show inverse relation with poverty rate, their statistical significances are inconsistent. The secondary completed level is not significant at any level whereas, some secondary level is once GPI is discounted that too only with no and country fixed effects.

When GPI is unaccounted for, tertiary completed shows a negative relation with poverty rate and is statistically significant in equation 11 (country fixed effects, no year fixed effects). Some tertiary level, however, poses an ambivalence in equation 11 and 12. Its slope coefficients not only show a positive relation with poverty rate, but they are also statistically significant. The interpretation, therefore, has to be precise. Some tertiary education is not inherently misleading, but with respect to the poverty rate, it is positively correlated. Here could be a possible explanation for such a relation. Individuals with some tertiary education will not have any credentials from higher education, and all the rights and privileges thereof. The years spent in tertiary education also turns into a sunk cost, such as educational expenses and opportunity costs.

The remainder of the control variables follow a similar trend from Table 6 and interpretation; the only difference is in educational expenditure variable in equation 6. It is statistically significant to both country and year fixed effects with the current set of educational attainment variables as opposed to statistically significant with only country fixed effects in Table 6.

VI. Case Studies

The findings from the regressions above accentuate the significance of primary education and gender equity in education to alleviate poverty. Some factors, such as culture, geography, ethnicity/tribe, and religion, lay outside the realm of the econometric framework which cannot be readily quantifiable yet have significant influences on the poverty rate. The case studies are a descriptive, exploratory, and comparative analysis of selected nations to highlight the factors not gleaned by econometric work. This paper chose Nepal and Ethiopia as its case studies' subjects for the following reasons:

Robert & Barro Lee's dataset has Nepal among the sample nations, so the findings serve as a robustness check of the inferences derived from the regression. Similarly, Nepal is the author's native nation; thus, the author retrieved numerous local resources, such as newspaper articles, reports in Nepali, and policy briefings as evidence.

Ethiopia, on the other hand, is not listed in the Robert & Barro Lee's dataset. Although both Nepal and Ethiopia are landlocked nations and have a federal parliamentary republic government, it represents a different continent. Ethiopia also presents itself as an interesting subject. Nearly 9 out of 10 extreme poor will reside in Sub-Saharan Africa by 2030; however, Ethiopia is the fastest growing economy in Africa. The poverty rate had fallen from 44 percent in 2000 to 23.5 percent in 2015/16, and the second-most populous nation in Africa recorded annual average GDP growth of about ten percent in the last decade, driven by public investments in agriculture and infrastructure (International Monetary Fund African Department, 2018).

Nepal. Nepal has made successful strides to alleviate poverty over the years. The South Asian nation had an extreme poverty rate (as defined by the World Bank) of 61.9% in 1995, and the figure reduced to 15% in 2010 (World Bank, 2018). The steady decrease in the poverty rate

could be attributed to multiple factors; however, the numbers belie a harsh reality. Nepal is among the poorest nations in the world. It remained among the least developed countries in Asia in 2015 and ranked 144th out of 188 countries in the UN Human Development Index (Selim, 2016). A quarter of Nepal's population was below the national poverty line in 2010, and 15% of the employed population worked below $1.90 purchasing power parity in 2010 (Asian Development Bank, 2018). Different variables could explain the pernicious reality; however, patriarchy, quality of public education, and geography of Nepal among others substantially underline the poverty rate in Nepal.

Patriarchic culture is a substantial impediment to the educational attainment of girls in Nepal. In Barro and Lee's dataset, 23.6% of the male population in Nepal had no formal education in 2010. However, 48.0% of the female population had no formal education in the same year. The percentage is nearly half of the female population and more than twice as much as the male population. At all levels of education, the male population had higher enrollment and completion rate than did the female population.

The staggering gender inequality can not only be observed in an educational setting but also in the workforce. Women held only 32.7% of the seats in national parliaments in 2018 (Asian Development Bank, 2018). In 2017, the female to male labor force participation (in percentage) was 96.4%. However, only 10.7% of female labor force were employed in services sector as opposed to 30.4% of male labor force. Likewise, only 10.1% of employed female were either wage or salaried workers in 2017 whereas 30.5% of male workers worked on wages or salaries (Gender Data Portal, 2018).

A majority of the population in Nepal rely on agriculture and subsistence farming to sustain their living. Females heavily dominate the agricultural economy in terms of labor

participation, but only 10% percent of females own the farmland (Pipoppinyo, 2019). Therefore, in an attempt to attain gender equity, Nepal's Ministry of Agricultural and Livestock Development (MoAD) introduced the Agriculture Development Strategy (ADS) in 2015. ADS is a 20-year development strategy which has established a target for women to own 50 percent of farmland by 2035 (Pipoppinyo, 2019). It offers tax cuts to female-owned land and recommends equal wages for women as well as equal participation of both male and female farmers in agriculture.

Gendered society of Nepal deprives females of invaluable life opportunities, such as education and employment. When their potentials and economic opportunities are impeded, the result is bleak future of unemployment and increased dependence on males who probably are the only working parent. This patriarchic culture constitutes to lack of economic freedom and higher poverty rate. The entire nation suffers from this because females are more than half of Nepal's population.

More prominent than the issue of gender equity in education is the quality of public education in Nepal. Of Nepal's 29 million population, 80% live in rural areas (Central Bureau of Statistics, 2012). Rural communities only have access to government schools. The quality of public education, however, has a stark contrast with private education. ~90% of the students from private school graduated from the secondary school system in Nepal in 2015; however, only ~32% of the students from public schools did in the same year. In addition, in 2014, an early grade reading assessment showed that 19% of third-graders in public schools could not read a single Nepali word. Moreover, less than 13% of them could read with fluency and comprehension (USAID). Worse, 85% of the total students in Nepal attend public schools.

Nepal adopted the letter grading system in 2015. Under the new system (effective from 2016), a GPA above 3.60/4.00 is considered "outstanding performance," and a GPA of 2.80 or above is considered "good grades." Out of the total students who appeared in the examination, only 3.8 percent students had "outstanding performance," whereas, approximately 68 percent students got a GPA less than 2.00 (Ghimire, 2018). Of seven provinces of Nepal, the rural provinces had the poorest performance. Province 6 had only 7.1 percent of students who scored above a GPA of 2.80 or above. Similarly, Province 7 had the second lowest with just 9.4 percent of students getting 2.80 or above GPA. A grim quality of education with such high failure rates discourages students from attending schools in rural areas.

Nepal's geography also poses a hindrance to its poverty alleviation. The poverty rate, as a result, is patterned across three different ecological regions of Nepal – mountains, hills, and Terai (plain terrains). In 2011, the mountainous regions had the highest poverty rate in all three regions with 42.3%. The Terai region had the lowest poverty rate with 23.4%, and the hilly region had 24.3% (Central Bureau of Statistics, 2012). In correlation with the poverty rate, the mountainous region is the least developed region as well. The weather is cold and unfavorable for agriculture. The land is infertile, so limited crops, such as potato and barley, grow in the region. Because of the rocky landscapes, transportation is inaccessible and limited to the few, which also divorces people there from the rest of the nation. The region also has low population density, so other infrastructures, such as electricity, are underdeveloped as well.

Also, Nepal heavily relies on foreign assistance for its development projects. The nation has been a recipient of foreign aid after it joined the Colombo Plan for Cooperative, Economic, and Social Development in Asia and the Pacific (formerly called the Commonwealth of Nations) in 1952. Since, Nepal has coordinated with numerous international financial institutions, such as

the World Bank and the Asian Development Bank, and donor nations, such as the United States, India, and Japan, to discuss development aid policies. Japan, for example, granted an aid of 26 billion Japanese Yen (~192 million USD) to Nepal to construct a highway that connects the Kathmandu valley with the eastern plain terrains. The highway is the shortest link between the two regions, reducing the total distance by 150 km, or by four hours (Ekantinpur Report, 2015). Similarly, Japan also offered financial assistance of $157 million to Nepal to build the nation's first tunnel. The 2.5 kilometers (1.55 miles) tunnel connects Kathmandu to the rest of the country, shortens the travel distance by 4 kilometers (2.49 miles), and significantly eases traffic congestion (The Japan Times, 2016).

The effects of foreign aids and development projects on poverty alleviation are hard to quantify, however, the association between them can be established. After highways are built courtesy of foreign aid, they bridge two different geographical regions disconnected otherwise and stimulate increased accessibility between them. People and resources in the regions are mobile as a result, which encourages economic and social activities. The increase in accessibility and mobility, in the end, can spur economic growth.

Ethiopia. The World Bank has committed to reducing the extreme poverty rate to less than 3% by 2030. Nearly 9 out of 10 extreme poor, however, will reside in Sub-Saharan Africa by 2030. Ethiopia, however, is the exception. Ethiopia was the second poorest country in the world in 200, but it is the fastest growing economy in the region now. The real GDP growth of Ethiopia averaged around 10.9% between 2004 and 2014. Such a growth rate has positioned the nation to become a middle-income country by 2025 (Moller, 2016). Likewise, Ethiopian households experienced a decade of significant progress in their wellbeing, so did society. The extreme poverty rate of the second-most populous nation in Africa (2011 PPP) reduced to 27.3%

in 2015 from 71.1% in 1995 (World Bank, 2018). The decrease is a stellar reduction of 43.8% in only two decades, or 2.19% annually while the average reduction of global poverty was 0.7% annually. Fertility rate, in addition, dropped from 7.0 in 1995 to 4.6 in 2011. Undernourishment, a significant issue in Ethiopia, fell from 75 percent in 1990-1992 to 35 percent in 2012-2014 (World Bank Group, 2015). The main drivers of the economic growth from 2001-2015 were sustained public investment in the agricultural industry and steady progress infrastructure and service sectors.

Agriculture drives Ethiopia's economy. The agriculture sector employs more than 70% of Ethiopia's population and accounts for 36.3 percent of the GDP (UNDP Ethiopia, 2018). The nation has invested about 14.7% of all government expenditure annually to the agriculture sector since 2003. Similarly, the African Union's Comprehensive Africa Agricultural Development Program (CAADP) had targets to increase public investment in agriculture by 10% by 2008 and grow the agricultural production by, at least, 6% by 2015. Ethiopia is among the few African nations meet the target. Similarly, the Government of Ethiopia has been heavily involved in the expansion of infrastructure including railways, hydropower generation, and roads as well as social services, such as education, water, health, and sanitation. Since 2008/09[1], the service sector outputs more than the agricultural sector in terms of contribution to GDP. It contributed to 39.3 percent of GDP in 2018 (UNDP Ethiopia, 2018).

What propelled high level of public investments and growths in agriculture, infrastructure, and services were national economic policies geared towards poverty reduction. Ethiopia, since the early 1990s, has pursued a "developmental state" model which involves an

[1] The 2008/09 is a mismatch caused when the Ethiopian calendar is translated to the Gregorian. Ethiopian calendar is behind Gregorian calendar by seven to eight years.

active and strong role for the Government of Ethiopia in many aspects of the economy. Government is the central tenet to boost economic growth and improve public access to basic services. The model is one of Agricultural Development-Led Industrialization which emphasizes agricultural growth to lead the economic transformation (World Bank Group, 2015). In line with the "developmental state" model, the government passed 5-year national economic plans between the period 2001-2015 with poverty alleviation, sustainable economic growth, and MDGs goals in perspective – Sustainable Development and Poverty Reduction Program (SDPRP), Plan for Accelerated and Sustained Development to End Poverty (PASDEP), and Growth and Transformation Plan (GTP).

SDPRP was a pro-poor agricultural development policy targeted towards smallholder farmers to achieve economic growth and remove itself from dependence on food aid. Because the majority of the Ethiopian population are subsistence farmers, the government invested primarily in the agrarian economy to alleviate poverty among poor people and to benefit them the most from the developmental policy. The government of Ethiopia implemented the policy in 2002/03 and was later succeeded by PASDEP.

PASDEP was a five-year development plan adopted in 2005/06 which served as a poverty reduction strategy and development framework for the period. Cognizant of MDGs, the development strategy established on a strong basis for human rights, aimed to put an end to extreme poverty, and ensured sustainable development. PASDEP based itself on eight pillars where the underlying principle was rural growth, acceleration of the private sector to create employment, and efficiency of public institutions. The growth also emphasized the commercialization of agriculture and the private sector to achieve the MDGs (PANE, 2008).

During the period, the Sub-Saharan African nation was able to attain the first MDGs target of halving 1990 poverty rate, five years ahead of schedule.

Following PASDEP, GTP was the national five-year plan adopted by the Government of Ethiopia to bolster the nation's economy with a projected annual GDP growth rate of 11-15% from 2010 to 2015. The development policy encouraged large-scale foreign direct investment opportunities, primarily in the agricultural and industrial sectors.

China had been a long-established investor in Ethiopia. It financed the Wereta-Weldiya road across Ethiopia's Rift Valley in 1972 and funded 15% of the cost of Addis Ababa's ring road (Bräutigam, 2011). After Ethiopia's unprecedented economic growth, Chinese companies demonstrated a vested interest in Ethiopia. Chinese telecom firm ZTE, for example, provided a $1.5 billion commercial suppliers' loan (at Libor – interbank lending rate – plus 1.5%) to the Ethiopian government to provide cellular and 3G services across the nation (Bräutigam, 2011). Although the credit is considered a mutual benefit loan – Ethiopia gets the finance for development and a Chinese company does the business, time will unfold if Ethiopia will successfully pay back the debt with interest.

Although Ethiopia is a thriving economy, it is still among the poorest countries in the world. The Human Development Report ranked Ethiopia as 174th out of 188 countries (Jahan, 2016). The poor base and increasing population have challenged poverty alleviation and economic growth. Poverty in Ethiopia is geographically patterned and thus is a rural phenomenon. While urban poverty decreased from 36.9% in 2000 to 14.8% in 2016, rural poverty only reduced to 25.6% from 45.5% during the same period (UNDP Ethiopia, 2018).

VII. Conclusion

This paper examines the effect of educational attainment on poverty rate through a panel data approach and case studies. The dataset builds on Barro and Lee's educational attainment and World's Bank poverty rate dataset of 108 nations from 1975 to 2010 in 5-year intervals. The educational attainment variables were classified into three categories: average years of total schooling, total education in primary, secondary, and tertiary level, and educational enrollment and completion in each level. Using univariate and multivariate linear OLS regression model and country and time/year fixed effects, the paper finds that poverty rate has a statistically significant inverse relationship with primary education – total, complete, and incomplete – and gender parity index at primary and secondary education level. Case studies of Nepal and Ethiopia, likewise, unearth the dimensions of poverty not gleaned by econometric works.

As with any empirical work, this paper also suffers from limitations. Although the paper utilizes exhaustive volumes and sources of data, a larger and updated sample size was desirable. The poverty rate only had a total observation of 404 across 108 nations, and because Barro and Lee's dataset only had data till 2010, the whole study was limited to the period. The poverty rate data is available for 2018, and more data has been collected in the last decade than ever any other decade. Updated Barro and Lee's dataset would have significantly increased the sample size, making statistical models and findings more robust.

The correlational nature of the study also questions the validity of the findings. The answer is unclear to where the direction of the relationship between the associated variables flows. Similarly, the paper utilizes fixed effect models to minimize the country-specific and time-specific variations; however, the question still holds if the findings can be generalized to all sampled nations. Future studies should incorporate more models, such as tests for

Heteroscedasticity and Granger causality test so that they could potentially claim the findings to be more precise and applicable to all sample nations.

Similarly, the study fails to detail if the years of education were from government or private institutions. Some nations, such as Nepal, have documented the difference between public and private education in terms of quality education. The results would have grave implications if the educational variables could incorporate the quality of education in addition to years of education and total educational level (complete and incomplete).

Finally, the generalizable educational level – primary, secondary, and tertiary – to all sampled nations might be subject to debate. Secondary education, for example, in the two nations are hardly the same. Different nations employ different admission tests and standards to complete the level. Barro and Lee's dataset could potentially cluster groups of nations who follow a similar educational system or the curriculum.

The generic measurement of poverty rate, likewise, could also be brought in question. The World Bank definition of extreme poverty rate puts different nations out of sync. An individual from the United States is far more likely to earn $1.90 a day than an individual from Ethiopia because $1.90 could be a substantial amount in local currency. This casts doubts on who the "poor" actually is and what poverty constitutes as.

In closing, the findings of this paper amid its limitations and flaws help build narratives of educational attainment on the poverty rate and result in policy implication in developing nations. Governments, for example, should heavily subsidize primary education or make it freely available with ease of accessibility. Girls should be encouraged to attend school, and this requires a change from a grassroots level. With such a measure, the nations could start to witness

a reduction in poverty. The future of this paper should emphasize on larger and updated datasets and more statistical methods to compute robust findings.

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Table 1

Summary Statistics of Poverty Rate

Year	N	mean	sd	Median
1950	0	.	.	.
1955	0	.	.	.
1960	0	.	.	.
1965	0	.	.	.
1970	0	.	.	.
1975	1	61.60	.	61.60
1980	8	7.12	8.83	3.40
1985	26	21.42	23.38	9.90
1990	45	24.94	27.22	9.35
1995	63	19.49	23.25	10.40
2000	68	21.30	22.40	12.30
2005	96	15.62	22.33	4.15
2010	97	11.66	19.60	2.00
Total	404	17.59	22.76	6.55

Table 2

Summary Statistics of All Variables

stats	Povert~e	NoScho~g	TotalP~y	Primar~d	SomePr~y	TotalS~y	Second~d	SomeSe~y
N	404	1898	1898	1898	1898	1898	1898	1898
mean	17.59	31.79	34.64	18.51	16.13	27.19	14.06	13.13
sd	22.76	28.90	19.69	13.78	13.61	20.56	13.65	10.90
median	6.55	22.70	33.02	15.72	13.24	23.28	9.52	11.41
min	0.00	0.00	0.25	0.09	-39.96	0.04	0.01	-30.78
max	94.10	99.59	91.18	81.53	78.16	88.99	71.80	84.07

stats	TotalT~y	Tertia~d	SomeTe~y	Averag~g	Fertil~e	lngdpP~a	FDI	EduExp~P
N	1898	1898	1898	1898	1544	1265	998	584
mean	6.37	3.60	2.76	5.45	4.12	8.20	3.42	4.27
sd	7.75	4.47	3.85	3.18	2.07	1.55	13.49	1.76
median	3.33	1.86	1.31	5.20	3.78	8.13	1.31	4.19
min	0.00	0.00	-7.87	0.02	0.84	4.91	-25.78	0.83
max	59.22	30.04	34.48	13.18	8.87	11.64	341.10	12.84

stats	GPI	Person~d	TradeP~P
N	764	789	1246
mean	93.32	3.72	72.96
sd	15.17	12.15	51.13
median	99.03	0.84	61.88
min	16.73	0.00	0.02
max	146.83	216.33	422.65

Table 3

Correlation Matrix of all Variables
(N = 175)

	Povert~e	NoScho~g	TotalP~y	Primar~d	SomePr~y	TotalS~y	Second~d	SomeSe~y
PovertyRate	1.0000							
NoSchooling	0.7613	1.0000						
TotalPrimary	0.1460	0.0597	1.0000					
PrimaryCom~d	-0.0016	-0.0245	0.8045	1.0000				
SomePrimary	0.2411	0.1244	0.7627	0.2296	1.0000			
TotalSecon~y	-0.5773	-0.7363	-0.6095	-0.4284	-0.5323	1.0000		
SecondaryC~d	-0.5116	-0.6794	-0.5776	-0.4791	-0.4249	0.8525	1.0000	
SomeSecond~y	-0.3016	-0.3426	-0.2598	-0.0683	-0.3514	0.5751	0.0626	1.0000
TotalTerti~y	-0.5750	-0.6080	-0.4044	-0.2615	-0.3781	0.4180	0.4725	0.0586
TertiaryCo~d	-0.5556	-0.5809	-0.3676	-0.2137	-0.3697	0.3966	0.4310	0.0826
SomeTertiary	-0.4715	-0.5063	-0.3588	-0.2599	-0.3049	0.3513	0.4173	0.0177
AverageYea~g	-0.7442	-0.9009	-0.4120	-0.2559	-0.3965	0.8133	0.8128	0.2809
FertilityR~e	0.8245	0.8606	0.1911	0.0409	0.2686	-0.7040	-0.6332	-0.3532
lngdpPerCa~a	-0.7480	-0.6772	-0.2049	-0.0329	-0.3000	0.4577	0.4266	0.2063
FDI	-0.1113	-0.1420	-0.0779	-0.0085	-0.1183	0.1335	0.0446	0.1850
EduExpendi~P	-0.3568	-0.3300	-0.2781	-0.1743	-0.2659	0.3405	0.2738	0.2216
GPI	-0.6320	-0.7792	0.0826	0.0688	0.0603	0.5009	0.4345	0.2763
PersonalRe~d	0.0095	0.0388	-0.1521	-0.1859	-0.0468	0.1863	0.1315	0.1500
TradePctGDP	-0.2747	-0.3456	-0.2870	-0.2523	-0.1956	0.4369	0.3975	0.2121

	TotalT~y	Tertia~d	SomeTe~y	Averag~g	Fertil~e	lngdpP~a	FDI	EduExp~P
TotalTerti~y	1.0000							
TertiaryCo~d	0.9141	1.0000						
SomeTertiary	0.8809	0.6133	1.0000					
AverageYea~g	0.7631	0.7065	0.6618	1.0000				
FertilityR~e	-0.5819	-0.5682	-0.4702	-0.8244	1.0000			
lngdpPerCa~a	0.7305	0.6631	0.6489	0.7649	-0.7233	1.0000		
FDI	0.1346	0.1763	0.0564	0.1695	-0.1288	0.1488	1.0000	
EduExpendi~P	0.4007	0.3657	0.3537	0.4305	-0.3326	0.4576	0.1639	1.0000
GPI	0.4213	0.4095	0.3425	0.6479	-0.7224	0.5051	0.0791	0.3761
PersonalRe~d	-0.2171	-0.1849	-0.2069	-0.0681	0.0475	-0.4110	-0.0170	-0.0023
TradePctGDP	0.2418	0.2689	0.1570	0.4294	-0.3238	0.2182	0.5500	0.3664

	GPI	Person~d	TradeP~P
GPI	1.0000		
PersonalRe~d	-0.0413	1.0000	
TradePctGDP	0.2674	0.0932	1.0000

Table 4

Univariate Linear OLS Regression

Response Variable: Poverty Rate
(The values in the tables represent coefficient and standard error of corresponding explanatory variable.)
*statistically significant at α = 0.10
**statistically significant at α = 0.05

Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) No Schooling	.745** .038	.651** .0755	0.311** 0.111						
(2) Total Primary				.259** .067	0.089 0.073	-0.215** 0.070			
(3) Primary Completed							.023 .116	-.048 .102	-0.179* 0.093
Country Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Time/Year Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes
N	404	404	404	404	404	404	404	404	404
R^2	0.50	0.49	0.44	0.04	0.04	0.03	0.00	0.00	0.04

Explanatory Variables	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(4) Some Primary	0.496** 0.091	0.150* 0.083	-0.155* 0.084						
(5) Total Secondary				-0.629** 0.045	-0.398** 0.061	-0.057 0.077			
(6) Secondary Completed							-.772** .059	-.414** .083	0.078 0.098
Country Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Time/Year Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes
N	404	404	404	404	404	404	404	404	404
R^2	0.07	0.07	0.01	0.33	0.33	0.10	0.30	0.30	0.00

Table 4 (continued)

Explanatory Variables	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(7) Some Secondary	-0.530** 0.093	-0.376** 0.098	-0.057 0.077						
(8) Total Tertiary				-11.773** 0.504	-0.409** 0.144	0.579** 0.162			
(9) Tertiary Completed							-2.153** .154	-.744** .225	0.625** 0.249
Country Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Time/Year Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes
N	404	404	404	404	404	404	404	404	404
R^2	0.07	0.07	0.10	0.34	0.34	0.11	0.33	0.33	0.04

Explanatory Variables	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
(10) Some Tertiary	-2.043** 0.185	-0.538* 0.321	1.338** 0.335						
(11) Average Years of Total Schooling				-5.407** .265	-3.95** .508	0.429 1.067			
(12) Fertility Rate							10.243** .446	6.009** .801	2.993** 1.250
Country Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Time/Year Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes
N	404	404	404	404	404	404	402	402	402
R^2	0.23	0.23	0.08	0.51	0.51	0.00	0.58	0.57	0.44

Table 4 (continued)

Explanatory Variables	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)
(13) ln (GDP Per Capita)	-11.773** 0.504	-20.406** 1.901	-14.402** 2.921						
(14) Foreign Direct Investment				-.101* .061	-.050 .049	-0.031 0.042			
(15) Educational Expenditure							-4.487** .781	-3.480** .740	-1.821** 0.707
Country Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Time/Year Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes
N	400	400	400	395	395	395	256	256	256
R^2	0.58	0.58	0.58	0.01	0.01	0.05	0.12	0.12	0.09

Explanatory Variables	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)
(16) Gender Parity Index	-1.204** .095	-.719** .087	-0.518** 0.091						
(17) Personal Remittances Received				.139 .083	-.172** .058	-0.175** 0.051			
(18) Trade							-.138** .026	-.113** .034	0.001 0.033
Country Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Time/Year Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes
N	289	289	289	371	371	371	395	395	395
R^2	0.36	0.36	0.34	0.01	0.01	0.02	0.07	0.07	0.04

Table 5

Multivariate Linear OLS Regression: Average Years of Total Schooling

Response Variable: Poverty Rate
(The values in the tables represent coefficient and standard error of corresponding explanatory variable.)
*statistically significant at α = 0.10
**statistically significant at α = 0.05 (highlighted in yellow)

Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Average Years of Total Schooling	-5.407** .265	-3.95** .508	0.429 1.067	0.542 0.550	-0.054 1.104	-0.378 1.443	0.066 0.484	0.162 0.944	0.816 1.216	-0.033 0.425	1.293 0.874	1.370 1.068
(2) Fertility Rate				5.523** 1.082	-3.307 2.443	-1.428 2.708	4.272** 0.833	-2.290 1.451	-1.528 1.695	4.706** 0.674	3.112** 1.167	4.267** 1.386
(3) ln (GDP Per Capita)				-7.621** 1.090	-13.029** 4.463	-13.195** 5.959	-7.889** 0.899	-16.276** 2.770	-14.176** 3.309	-8.504** 0.825	-18.862** 2.653	-18.725** 3.095
(4) Foreign Direct Investment (FDI)				0.059 0.099	-0.070 0.143	-0.107 0.156	0.014 0.033	0.011 0.035	0.005 0.036	0.042 0.035	-0.004 0.040	-0.019 0.040
(5) Educational Expenditure				0.819 0.626	-1.985** 0.801	-1.752** 0.876						
(6) Gender Parity Index				-0.238** 0.109	-0.868** 0.174	-0.788** 0.192	-0.327** 0.093	-0.576** 0.107	-0.505** 0.113			
(7) Personal Remittances Received				-0.779** 0.153	-0.783** 0.210	-0.662** 0.218	-0.852** 0.136	-0.866** 0.177	-0.763** 0.183	-0.922** 0.131	-0.860** 0.169	-0.765** 0.176
(8) Trade				-0.016 0.026	0.019 0.043	0.006 0.044	0.012 0.018	0.018 0.034	0.016 0.035	-0.008 0.017	-0.011 0.033	-0.024 0.034
Country Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Time Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
N	404	404	404	175	175	175	259	259	259	357	357	357
R^2	0.51	0.51	0.00	0.77	0.62	0.67	0.75	0.66	0.66	0.71	0.65	0.66

Table 6

Multivariate Linear OLS Regression: Total Education

Response Variable: Poverty Rate
(The values in the tables represent coefficient and standard error of corresponding explanatory variable.)
*statistically significant at α = 0.10
**statistically significant at α = 0.05 (highlighted in yellow)

Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Total Primary	-0.490** 0.059	-0.602** 0.098	-0.335** 0.113	-0.110 0.093	-0.363* 0.181	-0.367* 0.186	-0.090 0.081	-0.347** 0.140	-0.320** 0.140	-0.218** 0.056	-0.458** 0.125	-0.407** 0.129
(2) Total Secondary	-0.630** 0.049	-0.722** 0.082	-0.243* 0.131	-0.021 0.084	-0.215 0.180	-0.208 0.199	-0.097 0.075	-0.238* 0.141	-0.153 0.153	-0.205** 0.054	-0.326** 0.132	-0.227 0.143
(3) Total Tertiary	-1.031** 0.086	-0.608** 0.143	0.210 0.225	-0.017 0.125	-0.141 0.231	-0.119 0.271	0.007 0.117	-0.015 0.186	0.193 0.227	-0.198** 0.099	0.116 0.184	0.276 0.217
(4) Fertility Rate				5.293** 1.160	-3.720 2.429	-2.507 2.721	3.694** 0.899	-3.120** 1.400	-3.432** 1.733	3.477** 0.665	-0.166 1.247	-0.025 1.594
(5) ln (GDP Per Capita)				-7.241** 1.089	-14.202** 4.551	-13.106** 5.838	-8.035** 0.932	-17.511** 2.858	-14.366** 3.261	-7.571** 0.826	-19.225** 2.625	-17.538** 3.002
(6) Foreign Direct Investment (FDI)				0.065 0.100	-0.066 0.143	-0.077 0.155	0.015 0.033	0.003 0.035	0.000 0.035	0.032 0.035	-0.013 0.038	-0.023 0.039
(7) Educational Expenditure				0.592 0.643	-1.917** 0.785	-1.362 0.881						
(8) Gender Parity Index				-0.137 0.127	-0.707** 0.188	-0.603** 0.206	-0.260** 0.109	-0.440** 0.114	-0.379** 0.117			
(9) Personal Remittances Received				-0.784** 0.155	-0.800** 0.207	-0.721** 0.216	-0.835** 0.139	-0.895** 0.173	-0.798** 0.178	-0.870** 0.128	-0.887** 0.162	-0.804** 0.169
(10) Trade				-0.016 0.026	-0.002 0.043	-0.007 0.045	0.015 0.018	0.003 0.033	0.007 0.034	0.002 0.017	-0.028 0.032	-0.034 0.032
Country Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Time Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
N	404	404	404	175	175	175	259	259	259	357	357	357
R^2	0.53	0.50	0.04	0.77	0.64	0.67	0.75	0.67	0.63	0.72	0.65	0.63

Table 7

Multivariate Linear OLS Regression: Total Education Enrollment and Completion

Response Variable: Poverty Rate
(The values in the tables represent coefficient and standard error of corresponding explanatory variable.)
*statistically significant at α = 0.10
**statistically significant at α = 0.05 (highlighted in yellow)

Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Primary Completed	-0.698** 0.087	-0.585** 0.112	-0.277** 0.131	-0.156 0.108	-0.351* 0.202	-0.346* 0.201	-0.172* 0.098	-0.380** 0.152	-0.329** 0.153	-0.227** 0.081	-0.409** 0.143	-0.357** 0.145
(2) Some Primary	-0.326** 0.077	-0.619** 0.115	-0.350** 0.123	-0.038 0.126	-0.331 0.214	-0.393* 0.226	0.013 0.105	-0.296* 0.170	-0.316* 0.172	-0.180** 0.069	-0.510** 0.129	-0.471** 0.136
(3) Secondary Completed	-0.640** 0.064	-0.688** 0.096	-0.123 0.147	-0.012 0.093	-0.259 0.185	-0.259 0.207	-0.094 0.085	-0.242 0.147	-0.132 0.164	-0.126* 0.071	-0.261* 0.141	-0.162 0.153
(4) Some Secondary	-0.577** 0.070	-0.769** 0.114	-0.316** 0.142	-0.027 0.102	-0.068 0.204	-0.078 0.211	-0.103 0.094	-0.215 0.165	-0.173 0.168	-0.262** 0.065	-0.395** 0.144	-0.300* 0.153
(5) Tertiary Completed	-1.243** 0.189	-1.056** 0.291	-0.196 0.324	-0.129 0.191	-0.448 0.320	-0.497 0.336	-0.126 0.182	-0.453 0.284	-0.259 0.309	-0.224 0.178	-0.601** 0.299	-0.412 0.320
(6) Some Tertiary	-0.730** 0.195	0.001 0.401	0.881** 0.432	0.103 0.211	0.510 0.489	0.632 0.519	0.132 0.201	0.697* 0.389	0.949** 0.419	-0.231 0.168	1.098** 0.383	1.277** 0.404
(7) Fertility Rate				5.047** 1.190	-3.047 2.473	-2.029 2.708	3.376** 0.924	-3.286** 1.508	-3.796** 1.774	3.745** 0.709	0.388 1.325	0.093 1.608
(8) ln (GDP Per Capita)				-7.255** 1.101	-14.103** 4.565	-13.355** 5.788	-7.927** 0.949	-17.610** 2.843	-14.163** 3.275	-7.572** 0.828	-18.973** 2.607	-16.901** 2.980
(9) Foreign Direct Investment (FDI)				0.086 0.103	-0.058 0.143	-0.047 0.154	0.022 0.034	0.001 0.034	-0.001 0.035	0.043 0.035	-0.019 0.038	-0.027 0.038
(10) Educational Expenditure				0.657 0.653	-1.878** 0.808	-1.303** 0.882						
(11) Gender Parity Index				-0.163 0.132	-0.707** 0.187	-0.592** 0.205	-0.289** 0.110	-0.447** 0.115	-0.378** 0.118			
(12) Personal Remittances Received				-0.792** 0.156	-0.804** 0.206	-0.745** 0.215	-0.845** 0.139	-0.897** 0.172	-0.811** 0.177	-0.893** 0.129	-0.890** 0.160	-0.813** 0.167
(13) Trade				-0.019 0.027	0.007 0.044	0.006 0.045	0.016 0.019	0.002 0.034	0.007 0.034	0.001 0.017	-0.032 0.032	-0.036 0.032
Country Fixed Effect	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Time Fixed Effect	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
N	404	404	404	175	175	175	259	259	259	357	357	357
R^2	0.54	0.48	0.00	0.78	0.66	0.67	0.75	0.67	0.60	0.72	0.64	0.60