IJER © Serials Publications
12(3), 2015: 761-773
ISSN: 0972-9380

THE RELATIONSHIP BETWEEN FEMALE EDUCATION AND GROWTH IN DEVELOPING COUNTRIES

Casey Abington*

Abstract: *While progress has been made in reducing the gender gap in access to education, girls are still less likely to attend school. The disparity is largest in poorer countries where girls and women face numerous barriers. This paper employs panel data over the period 1970 to 2013 to examine the relationship between female education and economic growth in developing countries. The empirical evidence shows that female secondary school completion rates have a positive andstatistically significanteffect on growth, while female primary school completion rates and female tertiary enrollment both exhibit a negative and insignificant impact.*

Keywords*: economic growth, education, human capital, gender*

JEL classification codes: *O4, I2*

INTRODUCTION

Gender equality policies have gained global focus recently and much progress has been made over the last two decades. The World Bank has elevated gender equality to an integral component of their mission to reduce poverty, and education is central to their strategy with numerous programs underway to analyze and improve girls' education across countries[2]. The United Nations is also focused on gender issues. A primary goal is to "promote gender equality and empower women" by eliminating gender disparity in all levels of education (U.N., 2013). To this end, the United Nations Girls' Education Initiative (UNGEI) was created in 2000 to help nations advance gender equality and improve the quality of educationfor all children (UNGEI, 2015). Furthermore, United Nations Educational, Scientific and Cultural Organization (UNESCO)has made gender equality one of its two global priorities (UNESCO, 2015).These and other initiatives focused on educating girlshave resulted in significant improvements.

The World Bank reports that the gender gap in primary school enrollment has been closed in nearly all countries, while the gap in secondary enrollment is closing

* Northwest Missouri State University, *E-mail: casey@nwmissouri.edu*

quickly (World Bank, 2012). Unfortunately, however, this progress is not universal. According to the United Nations, poverty and gender are the two key determinants keeping children out of school (U.N., 2013). Girls are less likely than boys to attend school, as are children from poor families. This gender gap remains largest in poorer countries, especially in areas of Africa and Asia, where girls and women face barriers such as young marriage, early pregnancy, domestic violence, and responsibilities at home such as childcare and water collection (U.N., 2013).

With more girls enrolling and completing all levels of education, more women are entering the labor force as well. The World Bank estimates that women make up 40 per cent of the global labor force (World Bank, 2012). This raises the question of whether or not the increases in female education and participation in the labor force have translated into increased productivity and economic growth. While there is general consensus across the economic growth literature that education is an important determinant of productivity and growth, less is known about the effect of female educationspecifically. This paper explores that relationship by examining the impact of three measures of female education on the economic growth rate in developing countries.

LITERATURE REVIEW

Exploring the determinants of economic growth became an increasingly popular research topic in the 1990's, beginning with the seminal work of Barro (1991). His study examines the growth rate of real gross domestic product (GDP)for 98 countries during the time period from 1960 to 1985. He finds a positive relationship between growth and a country's initial level of human capital, which he measures using 1960 school enrollment rates.Following this important work, there have been countless attempts to further explain differences in economic growth rates across countries. Most of these studies employ cross-sectional regressions that include a wide variety of independent variables. Nearly all of these studies include at least one variable to represent human capital. Human capital is the knowledge and skills obtained from education, training, and experience. This is a complex concept and is therefore difficult to accurately measure. The majority of studies focus on the education aspect and use a quantity or stock measure of schooling to proxya country's human capital. The most common of these are enrollment rates and years of schooling completed.

The measurement of human capital has evolved over time as new and expanded data have become available.In addition, there have been a number of studies focused solely on improving the measurement of human capital.For example, Barro and Lee (1993) provide an updated and improved dataset of years of schooling completed. This educational attainment dataprovide a more accurate reflection of human capital than measures such as enrollment and literacy rates that are common inearlier studies. Additionally, the authors construct a separate dataset of educational attainment variables for the adult female population in 129 countries. This dataset enables

researchers to study the importance of female education independently frommale education. From their dataset, Barro and Lee (1993) observe that the difference between male and female years of schooling in developed countries has been small—female attainment has been about 95 per cent of that of males. However, they find that the difference in developing countries has been substantial—female attainment was 50 per cent of that of males until 1970, and improved to 67 per centby 1985.

In another significant contribution, Barro (2001) again analyzes the determinants of economic growth but this time with a sharper focus on the role of human capital. He first finds that male secondary and higher levels of schooling attainment positively impact cross-country economic growth rates. He then adds other measures of educational attainment one at a time. In general, he finds female education to have an insignificant relationship with growth. Specifically,female attainment at the secondary level exhibits a negative but insignificant impact on growth, while female primary schooling has a positive yet still insignificant impact. But, when fertility is not held constant, the coefficient for female primary schooling becomes significantly positive. Barro (2001)suggeststhat it is possible that female primary education promotes growth indirectly by encouraging lower fertility.

Psacharopoulos and Patrinos (2004) extend the literature by exploring patterns inreturns to education. They find the average rate of return to an additional year of schooling to be 10 per cent. The highest returns are shown to occur in low- and middle-income countries, especially those in Latin America, the Caribbean, and sub-Saharan Africa. More recently, Qadri and Waheed (2013) present similar conclusions showing that lower-income countries can experience higher returns to education in terms of economic growth than middle- and high-income countries.

When comparing male and female returns to education, Psacharopoulos and Patrinos (2004) show that overall, women receive higher returns. More specifically, it is shown that while the returns to primary education are higher for men, the returns to secondary education are much higher for women.

Important work by Hanushek (2013) examines the relationship between human capital and growth in developing countries while providing a history of the measurement of human capital. The data clearly show a considerable improvement in theeducational attainment of developing countries over time. However, Hanushek (2013) stresses the need to account for the quality of education, not just the quantity. While data on attainment and enrollment are widely available for developing countries; data that reflect the quality of schooling or the amount learned are not. International test scores arethe most common proxy for the quality of a country's schooling. While these data are becoming more readily obtainable for developed countries, they are still quite limitedfor developing countries.Using the limited amount of data available, Hanushek (2013) finds that higher achievement (scores) on international tests of mathematics and science are significantly, positively related to economic growth in developing countries. He concludes that while developing countries have increased

the quantity of education in terms of attainment and enrollment, quality has not significantly improved.He suggests that too much emphasis has been placed onincreasing enrollment rates and years of schooling, and not enough attention has been directed towards improving the quality of this schooling.Hanushek's (2013) results emphasize the need to consider the quality of education when measuring human capital.

While there are numerousother studies that explore the relationship between human capital or education and economic growth, relatively few make the distinction between female and male education. This paper contributes to the literature by focusing specifically on the relationship between female education and growth. Furthermore, this study employs an extended and updated datasetspanning the time period 1970 to 2013 for developing countries.

DATA AND METHODOLOGY

The relationship between female education and economic growth is examinedusing panel data from the World Bank's World Development Indicators(WDIs) database (World Bank, 2014a). The countries included in this study are thoseclassified as "developing" by the World Bank. According to the World Bank Income Classifications, developing countries are those categorizedas low income, lower-middle income, and upper-middle income (World Bank, 2014b). A total of 139 countries are analyzed over the period 1970 to 2013. See Table 4 in the Appendix for a list of the countries included in this analysis.

Hanushek (2013) provides a summary of the methodology generally used in cross-country economic growth studies. The methodology typically follows the work of Barro (1991) where economic growth is modeled as a function of human capital (H) and a vector of other variables (X). This is the basic methodology used for this paper and is specified as:

$$g = rH + X\beta + \varepsilon, \quad (1)$$

where r and β are unknown paramters to be estimated (Hanushek, 2013).

The model specification closely follows the work of Barro (2001). The dependent variable (g) is economic growth as measured by the annual percentage growth rate of a country's real GDP. The independent variables (X) parallel those used by Barro (2001) but differ slightly due to differences in datasets. The World Development Indicators (WDIs) dataset used here providesthe most up-to-date data available. The variables analyzed are quite similar to Qadri and Waheed (2013) as they follow similar methodology and also use the WDIs dataset.These explanatory variables include measures of the level of GDP, investment, government consumption, inflation, fertility, and exports. The measures of human capital (H) focus on female education. There are three variables that reflect female schooling attainment and female enrollment.See Table 1 for a list and description of each variable included in the model.Table 2provides summary statistics.

Table 1
Data Descriptions

Growth	*Annual percentage growth rate of real GDP per capita*
FDI	Net inflows of foreign direct investment as a percentage of GDP
Inflation	Annual percentage change in the average cost of a fixed basket of consumer goods and services (measured by the Consumer Price Index)
Govt	Government spending on operating activities to produce goods and services as a percentage of GDP
Exports	Value of exports of goods and services as a percentage of GDP
GCF	Additions to fixed assets plus net changes in inventories as a percentage of GDP
Fertility	Total fertility rate (births per woman)
logGDP	Log of GDP in current U.S. dollars in 1970 (beginning GDP)
Prim_comp	New entrants in the last grade of primary school as a percentage of female students of relevant age
Sec_comp	New entrants in the last grade of secondary school as a percentage of female students of relevant age
Tert_enroll	Ratio of total female enrollment in tertiary education to the female population of the relevant age group

Source: The World Bank (2014). *World Development Indicators*.Retreived 25 August, 2014, from http://data.worldbank.org/indicators

Table 2
Summary statistics of sample data

	*Mean**	*Std. dev.*	*Minimum*	*Maximum*
Growth	3.7998	6.8336	-62.0765	106.2798
FDI	3.3978	11.2687	-82.9274	366.3567
Inflation	44.3792	603.7081	-33.2060	24411.0308
Govt	22.0338	8.9915	0.02879	70.0575
Exports	31.6946	19.6174	0.1830	166.3635
GCF	22.7512	9.5185	-5.7397	93.1293
GDP	51632055976	289384269979	8824746	9240270452050
Fertility	4.6111	1.8487	1.0900	9.2230
Prim_comp	68.6006	31.4265	3.0170	195.9404
Sec_comp	48.4748	41.6023	0.1482	265.6858
Tert_enroll	14.3133	19.0828	0	148.5266

*Unweighted averages

The dependent variable is the annual percentage change in real GDP per capita. This is the typical measure used in the literature to reflect a country's economic growth. The largest growth rate experienced during the period 1970 to 2013 for the developing countries was 106.3 per cent. This extremely high rate of growth occurred in 1997 in the country of Liberia, where just seven years earlier the growth rate was -51.0 per cent. The lowest economic growth rate recorded during the period was -62.1 per cent for Libya in 2011, where the very next year the growth rate was a staggering 104.5 per cent. The average growth rate for the developing countries included in this study was 3.8 per cent.

The first explanatory variable included in the model is foreign direct investment (FDI), which is measured by net inflows of foreign direct investment as a percentage of a country's GDP. Foreign direct investment reflects capital investments made in a country by a foreign business. It is expected that foreign direct investment will increase a country's stock of physical capital as well as provide domestic jobs and income. Therefore, it is theorized that increases in foreign direct investment would have a positive impact on economic growth. Net inflows of foreign direct investment for the developing countries ranges from -82.9 per cent of GDP to 366.4 per cent, with an average of 11.3 per cent.

The next variable in the model reflects a country's inflation rate and is measured as the annual percentage change in the Consumer Price Index (CPI). The CPI reflects the average cost of a fixed basket of goods and services purchased by a typical consumer. Theory suggests that high rates of inflation cause uncertainty and can lead to reduced investment, while low rates of inflation provide more stability and certainty and can lead to increased investment. As such, it is hypothesized here that countries with higher levels of inflation would grow at a slower rate. The highest rate of inflation recorded in the dataset was hyperinflation of 24,411.0 per cent for Zimbabwe in 2007, the lowest was -33.2 per cent for Uganda in 1993. The average inflation rate was 44.4 per cent, which was clearly pushed upward by the hyperinflation experienced in several countries during the time period studied.

Barro (2001) includes the ratio of government consumption to GDP as a way to measure government spending that is not directly tied to productivity. This variable is not available in the World Development Indicators (WDIs)dataset. The WDIs variable included in this study is a measure of government spending on operating activities to produce goods and services. Barro (1991 and 2001) finds a negative relationship between government consumption and growth. He suggests that government spending might reduce growth by stifling investment or through "distorting effects from taxation or government-expenditure programs" (Barro, 1991, p. 430). As a percentage of GDP, government spending ranges from 0.03 per cent to 70.0 per cent, with an average of 22.0 per cent.

The value of a country's exports of goods and services as a percentage of GDP is included in the model as a proxy for the international openness variable used by Barro (2001). The fundamental equation to calculate GDP using the expenditure approach illustrates that exports are an addition to a country's GDP. Thus, exports are expected to have a positive relationship with economic growth rates. Myanmar in 2003 had the lowest level of exports at 0.18 per cent of GDP, while Maldives in 1981 had the highest level at 166.4 per cent of GDP. The overall average for the dataset is 31.7 per cent.

The gross capital formation (GCF) variablereflects additions to fixed assets as well as net changes in inventories. This variable is used to represent a country's level of investment. Growth theory indicates that a positive relationship should exist between investment and growth. Nicaragua had the lowest level of GCF at -5.7 per cent of

GDP in 1979, while Kiribati achieved the highest rate at 93.1 per cent in 1990. The average across all years and countries is 22.8 per cent of GDP.

Next, a country's initial level of productivity is measured using the value of GDP in 1970 U.S. dollars. Since the relationship between initial GDP and economic growth is non-linear, the GDP variable is logarithmically transformed. Taking the natural log helps the variable to better fit the model by making the distribution more normal. As pointed out by Barro (2001), there is a general consensus that a significant relationship between a country's beginning level of GDP and growth does not exist. However, when other explanatory variables are held constant, this relationship becomes statistically significant. Barro (2001) found the relationship to be small but positive for poorer countries and strongly negative for the richest countries. The variable is expected to reflect the concept of convergence whereby richer countries grow more slowly than poorer countries, giving potential for poorer countries to catch up, or converge. There is a wide range for this variable—from $8,824,746 for Tuvalu in 1990 to $9,240,270,452,050 for China in 2013. The average level of GDP for the dataset is $51,632,055,976.

The fertility variable is measured by the average number of births per woman in a country. Barro (2001) shows that higher fertility rates, which lead to faster long-run population growth, have a negative impact on a country's productivity. So, it is expected here that higher fertility rates will slow economic growth in developing countries. The lowest fertility rate in the dataset is 1.09 births per woman in Bulgaria in 1997 compared to the highest rate of 9.22 births per woman in Yemen in 1983. The average for the dataset is 4.61 births per woman.

Finally, the model includes three education-related variables focused on the female population in developing countries. The first is the female primary completion rate, which is the percentage of female students of relevant age who are enrolled in last year of primary school. Second is the female secondary completion rate, which is the percentage of female students of relevant age enrolled in the last year of lower-secondary school.[3] Third is the female tertiary enrollment rate, which is the ratio of total female enrollment in tertiary school to the female population that is of typical tertiary schooling age. An enrollment rate is used to reflect tertiary enrollment simply because there is no tertiary completion data available in the World Development Indicators (WDIs) dataset. The tertiary enrollment variable serves as a proxy for upper-secondary school completion. The rationale is that tertiary education requires successful completion of secondary schooling as a minimum requirement for admission. It is hypothesized that increases in each of these education variables would lead to higher levels of human capital in a country, and therefore, greater economic growth. The female primary completion rate ranges from a very low 3.02 per cent in Burundi in 1970 to 195.94 per cent in Maldives in 2002. Burundi also had the lowest female secondary completion rate of 0.15 per cent in 1971, while Belarus had the highest of 265.69 per cent in 2009. The tertiary enrollment rate ranges from 0 to 148.53 in Cuba in 2008. The averages of each level of education are 68.60 per cent, 48.48 per cent, and

14.31 per cent, respectively.The summary statistics and data show that it is possible for the primary and secondary completion rates as well as the tertiary enrollment rate to be greater than 100 per cent. There are several reasons why this might occur. First, there are likely to be students who begin a level of education later than at the typical age, or earlier than the typical age. Additionally, there are students who have repeated grades (World Bank, 2014a).Together, these situations can cause there to be a greater number of students enrolled in a particular level of education than the number of students that are actually of relevant age.

Fixed effects and random effects are the most commonly estimated models employed to analyze panel data. Equation (1), shown above,is estimated using both of these models. Which model is best depends on the nature of the variables that have been omitted from the model. A Hausman test is run to determine whether fixed effects or random effects is preferred for this study. The test indicates whether the two models give similar and consistent results. The result of the Hausman test shows that the estimates of the random effects model are quite different from those of the fixed effects model. This suggests that the random effects estimates are inconsistent and biased due to failure to control for omitted variables. Therefore, the fixed effects model is preferred as it helps to control for thisomitted variable bias.As such, all results reported below are based on fixed effects estimation.

The presence of heteroskedasticity and multicollinearity is a concern in any multiple regression model. A modified Wald test is performed to detect the presence of heteroskedasticity. This test indicates that heteroskedasticityis indeed present in the model, meaning the error terms do not exhibit constant variance. While heteroscedasticity does not result in biased parameter estimates, it can lead to biased standard errors. To control for the heteroskedasticity problem, the model is run with robust standard errors. Next, the data is tested for multicollinearity, which occurs when independent variables are highly correlated with each other. The presence of multicollinearity is tested using variance inflation factors (VIFs). The general rule of thumb is to be concerned about variables with VIFs greater than 10.0. The results show that all of the variables have a VIF less than 10.0. So, there does not appear to be a multicollinearity problem.

RESULTS

Results of the fixed effects estimation of Equation (1) are presented in Table 3. Column 2 gives the fixed effects coefficient estimate for each variable with the robust standard error in parentheses below. Columns 3 and 4 provide each regressor's t-statistic and p-value, respectively.

Four variables are shown to be significantly related to economic growth in developing countries at the 1 per cent significance level—foreign direct investment, inflation, government spending, and exports.[4] Foreign direct investment exhibits a positive relationship with growth, suggesting that higher levels of investment from

Table 3
Results

Dependent variable: Annual percentage growth rate of real GDP

Variable	*Coefficient*	*t-statistic*	*P>*
FDI	.167184*** (.0446544)	3.74	0.000
Inflation	-.0070561*** (.00159)	-4.44	0.000
Govt	-.2292474*** (.062276)	-3.68	0.000
Exports	.1228607*** (.0365923)	3.36	0.001
GCF	.1523049** (.0624049)	2.44	0.017
logGDP	.3077631 (.5056417)	0.61	0.545
Fertility	-1.14004 (1.460635)	-0.78	0.438
Prim_comp	-.0488467 (.0342607)	-1.43	0.158
Sec_comp	.0322637** (.0156001)	2.07	0.042
Tert_enroll	-.055699 (.035242)	-1.58	0.118
Constant	-.1279554 (12.4018)	-0.01	0.992

Robust standard errors are in parentheses.
*, **, and *** indicate significance at the 10 per cent, 5 per cent, and 1per cent levels, respectively.

foreign entities (as a percentage of GDP) increase a country's productivity.This result confirms basic growth theory that asserts that foreign direct investment increases a country's level of physical capital and, therefore, its productivity as well.The coefficient on the inflation variable is negative, which indicates that higher levels of inflation can have an adverse impact on a country's growth. This is the expected result and matches Barro's (2001) findings. The negative relationship suggests that high rates of inflation lead to uncertainty and reduced spending. The government spending variable is shown to have a negative relationship with growth. This might seem counterintuitive, but it is actually a common finding in the literature. It is possible that an increase in government spending could push up the price level or interest rates thereby reducing investment and consumer spending. Furthermore, the government spending variable is likely reflecting some spending that does not directly increase a country's productivity. Finally, the analysis shows that the value of a country's exports is significantly positively related to growth. This is an intuitive and theoretically sound finding that suggests that higher values of exports are associated with higher productivity and economic growth.

Table 4
Countries included (developing countries)

Afghanistan	*Cabo Verde*	*Ethiopia*	*Kazakhstan*	*Mexico*	*Romania*	*Tanzania*
Albania	Cambodia	Fiji	Kenya	Micronesia	Rwanda	Thailand
Algeria	Cameroon	Gabon	Kiribati	Moldova	Samoa	Timor-Leste
American Samoa	Central Afr. Rep.	Gambia, The	Korea, Dem. Rep.	Mongolia	Sao Tome and Princ.	Togo
Angola	Chad	Georgia	Kosovo	Montenegro	Senegal	Tonga
Argentina	China	Ghana	Kyrgyz Republic	Morocco	Serbia	Tunisia
Armenia	Colombia	Grenada	Lao PDR	Mozambique	Seychelles	Turkey
Azerbaijan	Comoros	Guatemala	Lebanon	Myanmar	Sierra Leone	Turkmen-istan
Bangladesh	Congo, Dem. Rep.	Guinea	Lesotho	Namibia	Solomon Islands	Tuvalu
Belarus	Congo, Rep.	Guinea-Bissau	Liberia	Nepal	Somalia	Uganda
Belize	Costa Rica	Guyana	Libya	Nicaragua	South Africa	Ukraine
Benin	Cote d'Ivoire	Haiti	Macedonia	Niger	South Sudan	Uzbekistan
Bhutan	Cuba	Honduras	Madagascar	Nigeria	Sri Lanka	Vanuatu
Bolivia	Djibouti	Hungary	Malawi	Pakistan	St. Lucia	Venezuela
Bosnia and Herzeg.	Dominica	India	Malaysia	Palau	St. Vinc. and Gren.	Vietnam
Botswana	Dominican Rep.	Indonesia	Maldives	Panama	Sudan	West Bank and Gaza
Brazil	Ecuador	Iran	Mali	Papua New Guinea	Suriname	Yemen
Bulgaria	Egypt	Iraq	Marshall Islands	Paraguay	Swaziland	Zambia
Burkina Faso	El Salvador	Jamaica	Mauritania	Peru	Syrian Arab Rep.	Zimbabwe
Burundi	Eritrea	Jordan	Mauritius	Philippines	Tajikistan	

Two variables are found to be statistically significant at the 5 per cent level—gross capital formation and female secondary school completion rate. The gross capital formation variable reflects changes to a country'slevel of physical capital as well as inventories. This investment variable is shown to have a positive relationship with economic growth. This result follows growth theory which suggests that increases in investment and physical capital will lead to increases in a country's productivity. More specifically, increased levels of physical capital expand a country's production capabilities and can increase the productivity of laborthereby increasing economic growth.Of the three female education variables examined, just one is found to have a statistically significant effect on growth in developing countries—the female secondary school completion rate.

The female secondary school completion rate exhibits a positive coefficient and is significant at the 5 per cent level. This suggests that productivity increases as more female students complete lower-secondary schooling.On the contrary, both the female

primary school completion rate and the female tertiary enrollment rate are found to be statistically insignificant and have negative coefficients. It is expected that increases in education, female or male, will increase a country's level of human capital and therefore, increase its productivity and growth. However, finding female education to have an insignificant and/or negative relationship with economic growth is not an unusual outcome. The growth literature provides some compelling explanations for these results.For example, the 2004 study by Psacharopolous and Patrinosprovides an explanation as to why female secondary schooling has a significant and positive effect on a country'seconomic growth, while female primary schooling does not. They showthat returns (measured by earnings)from primary educationare higher for men, while women experience higher returns from secondary education. Furthermore, labor market discrimination faced by women is another common explanation as to why female education might not be significant for growth. Barro (2001)suggests that, "many countries follow discriminatory practices that prevent the efficient exploitation of well-educated females in the formal labor market" (Barro, 2001, p. 15). This discrimination would clearly prevent educated women from reaching their full productive potential. To that end, the World Bank recognizes this gender discrimination and asserts that "eliminating barriers that discriminate against women working in certain sectors or occupations could increase labor productivity by as much as 25 per cent in some countries" (World Bank, 2012, p. xx). So, labor market discrimination could certainly helpexplain the negative, insignificant coefficient found for female tertiary enrollment.

Lastly, two non-education variables included in the model have statistically insignificant relationships with economic growth in developing countries. The natural log of a country's GDP has a positive yet insignificant coefficient. This is a common finding among the growth literature. As mentioned previously, Barro (2001) concludes that no significant relationship exists between a country's starting level of GDP and economic growth rate. Finally, the fertility rate variable has the expected negative coefficient, but is also insignificant.

LIMITATIONS AND FUTURE RESEARCH

The most obvious and importantlimitation of this study is related to data. The variables utilized to represent female educationare limited to the completion and enrollment rates available in the World Development Indicators (WDIs) database. Completion rates are available for female primary school and female lower-secondary schooling, but not for the upper-secondary or tertiary levels. Of greater consequence, however, is the lack of measures that reflect the quality of a country's education. Completion and enrollment rates measure only the quantity of education in a country, not the quality of that education. Undoubtedly, the quality of education differs vastly across countries.Recentliterature has stressed the importance of using measures of quality, not just the quantity of education as a proxy for human capital in growth regressions[5]. Unfortunately, these measures are relatively new and therefore unavailable for many developing countries. International standardized test scores are the most

commonlyused measure to try to capture the quality of education. Since test score data is only available for recent years and is not available for all countries, most studies still rely on quantity measures of education for use in growth regressions. In the future, when more test score data are available, it will be interesting to see if the results found here will differ when quality, not just quantity, is taken into account.

There are still many unanswered questions for future research. This study analyzed a relatively large number of countries that are quite diverse. More details may be gleaned by using the same model to analyze specific groups of countries. For example, it will be interesting to look at results for only the poorest countries, or for only the richest countries, or for particular regions such as Sub-Saharan Africa or Asia. Furthermore, the possible independent variables included in growth regressions are virtually endless. As such, many different variables could be added to the basic model. Some possible additions are measures of religion, rule of law, private versus public schooling, and geographic location. This future research can help to better understand the importance of female education.

CONCLUSIONS

Significant progress has been made in narrowing the gender gap in access to schooling across countries. As more females are gaining education, they are more likely to enter the labor force as well. Thus, an increasing percentage of the labor force in both developed and developing countries is comprised of women. This study provides mixed results as to the impact of female education on economic growth rates in developing countries. Female secondary schooling completion rates are shownto have a significantly positive effect on growth, while female primary schooling completion and female tertiary enrollment rates both exhibit a negative yet insignificant effect. A previous study by Psacharopolous and Patrinos (2004) shows that men gain higher returns to primary schooling,while women have higher returns to secondary schooling. However, this is only part of the explanation of the results. Educating women is just the first step to increasing productivity and growth. These educated women also need equal opportunities in labor markets. Advances in female education will not translate into greater productivity if women do not have access to certain jobs or face other types of labor market discrimination. Furthermore, the opportunity cost of working is still disproportionately high for women, particularly in developing countries where women are often solely responsible for childcare and water collection. In these countries, women also tend to get married and become pregnant at very young ages (U.N., 2013).

So, despite a great deal of improvement, much work remains. As gender parity has been mostly achieved in primary education, focus now needs to be on increasing access to secondary and tertiary education in our poorest countries and improving the quality of schooling at all levels. Attention must also be given to women's labor market experience. Do women have equal access to jobs in all sectors? Do women

experience wage disparity? Exploring questions such as these will help to better understand this study and similar research as well as guide policy relating to access to education and the labor market.

References

Barro, R., (1991), 'Economic Growth in a Cross Section of Countries', *Quarterly Journal of Economics*, 106(2), 407-443.

Barro, R., andLee, J., (1993), 'International Comparisons of Educational Attainment', *Journal of Monetary Economics*, 32(3), 363-394.

Barro, R., (2001), 'Human Capital and Growth', American Economic Review, 91(2), 12-17.

Hanushek, E. (2013), 'Economic Growth in Developing Countries: The Role of Human Capital', *Economics of Education Review*, 37, 204-212.

Psacharopoulos, G. and Patrinos, H., (2004), 'Returns to Investment in Education: A Further Update', *Education Economics*, 12(2), 111-134.

Qadri, F. and Waheed, A., (2013), 'Human Capital and Economic Growth: Cross-Country Evidence from Low-, Middle- and High-Income Countries', Progress in Development Studies, 13(2), 89-104.

UNESCO, (2014), 'Introducing UNESCO: What We Are', Retrieved 25 September, 2014, from *http://www.unesco.org/new/en/unesco/about-us/who-we-are/introducing-unesco/*

United Nations (U.N.), (2013), 'Millennium Development Goals and Beyond 2015: Fact Sheet', Retrieved 13 September, 2014, from *http://www.un.org/millenniumgoals/pdf/Goal_3_fs.pdf*

United Nations Girls Education Initiative (UNGEI), (2015), 'United Nations Girls Education Initiative: About Us', Retrieved 25 September, 2014, from *http://www.ungei.org/whatisungei/index.html*

World Bank, (2012), 'World Development Report 2012: Gender Equality and Development' Retrieved 13 September, 2014, from *http://siteresources.worldbank.org/INTWDR2012/Resources/7778105-1299699968583/7786210-1315936222006/Complete-Report.pdf*

World Bank, (2014a), 'World Development Indicators',Retreived6 August, 2014, from *http://data.worldbank.org/indicators*

World Bank, (2014b), 'Country and Lending Groups', Retrieved 8 August, 2014, from *http://data.worldbank.org/about/country-and-lending-groups*

World Bank Group, (2011), 'Learning for All: Investing in People's Knowledge and Skills to Promote Development', Retrieved 25 September, 2014, from *http://siteresources.worldbank.org/EDUCATION/Resources/ESSU/Education_Strategy_4_12_2011.pdf*