

**Gender Inequality in Education and Economic Growth in ASEAN Member
Countries**

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Abstract: This research paper investigates empirically the extent of gender inequality in education and its impact on economic growth in ASEAN member countries. The sample comprises 10 ASEAN member countries from the over the period 1970-2010. Using panel cointegration analysis, this paper finds that gender inequality is negatively associated with per capita GDP growth. On the other hand, the average year of schooling shows the significantly positive impact on economic growth. In terms of economic policy, the results suggest policymakers to focus on educational policies which may reduce educational inequalities, especially for men. In the case of women, the policy that encourages women to participate in economic activities could play a role in alleviating inequalities.

Keywords: *Gender Inequality, Education, Economic Growth, ASEAN.*

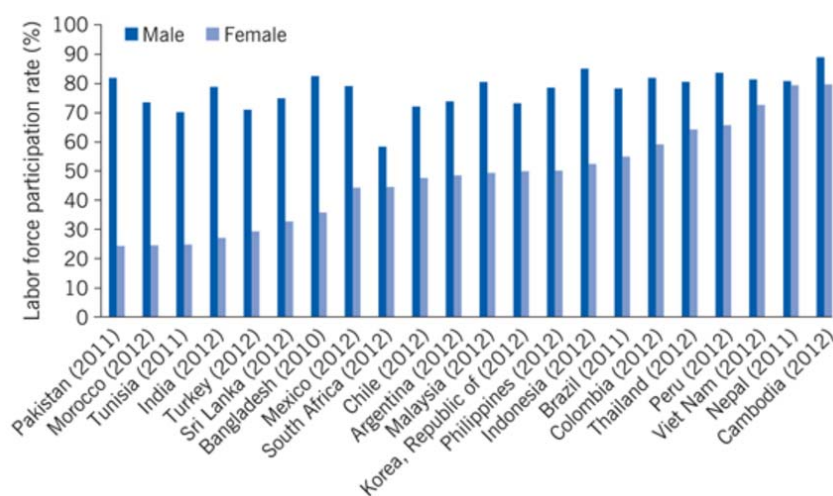
Introduction

For a number of years, education has played a key role in the economic and social development processes of both developed and developing countries. It can produce changes in which are productive for attaining political, social, and economic objectives. From an economic perspective, the level of education and its distribution within the population are believed to have a crucial role in the prospects of income distribution and consequently in economic growth. Especially in developing countries, education is well known to have a direct and positive effect on economic development, economic growth and productivity. Indeed, an increased level of education of individual leads to increased skills held by the workforce, which makes it is possible to improve labour productivity and therefore economic growth.

In ASEAN region, every country members seriously concern about education issue as can be seen from huge proportion of government spending goes for education. In a believed that investment in *human capital through education* is the engine of the development process. A better educated labour force may increase the return on research and development. Consequently, more education equals more economic growth. Therefore, governments in ASEAN countries have launched a number of policies to educate people. By looking at the loss of achievement within a country in three dimensions namely reproductive health, empowerment, and labour market participation can be used to see how bad a country perform in terms of gender inequality (UN, 2010). Governments in ASEAN countries have attempted to reduce gender inequality through education policies may help increase in female labour force participation rate. According to figure 1, labour force participation rate of women

varied from countries to countries and labour force participation rate of men were still higher than labour force participation rate of women in every countries. However, it is clearly that all governments commit themselves to provide equal access to high quality education and learning to people, inequalities still exist. According to Sadiman (2004), inequalities in the region exist not only between rural - urban areas and public – private education institutions or among provinces within the countries. There are also genders and socio-economic conditions that result to disparities in the delivery of quality learning opportunities among population.

Figure 1. Gender disparities in labour force participation rate in selected developing countries



Source: ILO Key Indicators of the labour market, 8th edition

Although gender inequality issues are visible on different social, political, and anthropological levels; its economic impact on the growth and development of ASEAN member countries' economy is important to be investigated. Hence, the aim of this study is to investigate whether inequality in education affects economic growth in ASEAN member countries.

Literature Review

It is unarguably that gender inequality has an impact on economic growth as can be seen from previous research studies on the relationship between gender inequality and economic growth. Lopez, Thomas and Wang (1998) found that the result for their study demonstrated the importance of education distribution in economic growth. They used panel data from 12 Asian and Latin American countries between 1970 and 1994. The results confirmed that the distribution of education is a key role in illustrating this tenuous connection between education and economic growth. Moreover, the unequal distribution of education has a negative impact on GDP per capita for most of the sample countries. Therefore, the effect of education on economic growth is very significant when the equality distribution of education is large. Klasen (1999) used panel regressions to examine the influence of gender inequality on economic growth. He found a negative influence of gender inequality on economic

growth. He also explained the reason why a negative influence exists in his study. He asserted that a bias in education directly impacts economic growth via lowering the average quality of human capital, and inequality in employment is also linked with lower growth. In addition, gender inequality in education also seemed to impact other factors impeding economic growth, such as fertility and child mortality rates, thus indirectly lowering economic progression. Checchi (2004) studied the relationship between the inequality of education and incomes. The results showed that when the negative correlation between the average level of education and its dispersion is taken into consideration, the relationship between the inequality of income and the average years of schooling takes a U shape. Klasen and Lamanna (2008) investigated the impact of gender gaps in education (female-male ratio of schooling and female-male ratio of the growth in the years of schooling) on economic growth. The result highlighted that gender gaps in education reduce economic growth through its effects on investment rates. Similarly, Khayria and Feki (2015) also applied the GMM dynamic panel for the five countries of the Great Maghreb during the period 1985-2011 to examine the relationship between gender gap and economic growth and found that there are a positive effect of population on economic growth but a significant negative impact of investment on economic growth. More importantly, they asserted that gender inequality has a significantly negative effect of on economic growth.

Methodology

Data

The empirical analyses in this study are based on macroeconomic indicators in ten ASEAN Member Countries which consist of Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam. The data were obtained from Penn World Table 8.0 and Barro-Lee Educational Attainment Dataset. The data contain information on real GDP per capita at constant 2005 national prices, share of gross capital formation at current PPPs, population, average year of total schooling and Gini coefficient of education. All the data are calculated in five-year averages from 1970-2010.

In order to construct the Gini index of education, we relied on Thomas, Wang and Fan (2002) formula to measure educational inequality. This index considers the distribution of schooling years amongst the population. The education Gini formula used in this paper is shown in equation (1)

$$G_{edu} = \left(\frac{1}{\mu}\right) \sum_{i=2}^n \sum_{j=1}^{i-1} p_i |y_i - y_j| p_j \quad (1)$$

Where G_{edu} is the education Gini based on education attainment distribution, μ is the average years of schooling for the concerned population, p_i and p_j stand for the proportions of population with certain levels of schooling, y_i and y_j are the years of schooling at different educational attainment levels, and n is the number of levels in attainment data, and $n = 7$ in this paper. Barro and Lee (1993) divided the population into seven categories including no-schooling (or illiterate), partial primary, complete primary, partial secondary, complete secondary, partial tertiary, and complete tertiary. The seven groups are both mutually exclusive and collectively inclusive for the concerned population.

Methodology

The impact of education inequality on the economic growth of the ASEAN member countries is estimated by using the following pooled OLS panel regression model.

$$\ln(y_{it}) = \beta_0 + \beta_1 csh_{it} + \beta_2 \ln(Sch_{it}) + \beta_3 G_{it}^S + \varepsilon_{it} \quad (2)$$

Where $\ln(y_{it})$ denotes the logarithm of real GDP per capita, csh_{it} is the share of gross capital formation, $\ln(Sch_{it})$ is the logarithm of average year of total schooling, G_{it}^S is the Gini index of education (for men S = men, for women S = women for all S = all) and ε_{it} denotes idiosyncratic measurement error. To better understand the impact of inequality of education upon economic growth, consideration is also given to calculating the impact of inequality in education in terms of gender.

Results and Discussion

Unit Root Test

The stationarity test to verify for the presence of unit root is presented in Table 1. The results showed that the variables are all non-stationary at levels. However, the variables become stationary after the first difference at 5% level of significance. Hence the variables are denoted as I(1), meaning they are stationary after first difference, thus integrated of order one. This implies that in the estimation the first difference of the variables will be used to avoid spurious regression results.

Table 1. Unit root test results at Level (0) and Level (1)

Level	<u>lnGDP</u>	CSH	<u>lnSCH</u>	G ^{all}	<u>G^{men}</u>	<u>G^{women}</u>
Levin, Lin & Chu t*	0.70499	0.10026	-1.71061**	-4.83137***	-6.17728***	-6.07796***
<u>Im. Pesaran</u> and Shin W-stat	2.89628	1.12706	1.12696	-0.04010	-0.78534	-0.94961
ADF - Fisher Chi-square	11.8353	17.3649	16.8574	21.6308	27.1848	32.2367**
PP - Fisher Chi-square	13.3714	19.2142	75.8163***	59.7651***	90.9395***	62.2531***

First difference	<u>lnGDP</u>	CSH	<u>lnSCH</u>	G ^{all}	<u>G^{men}</u>	<u>G^{women}</u>
Levin, Lin & Chu t*	-7.41150***	-5.49535***	-12.7569***	-5.44956***	-9.20769***	-6.78225***
<u>Im. Pesaran</u> and Shin W-stat	-2.84742***	-1.98032**	-4.23256***	-1.34771*	-1.38313*	-1.36725*
ADF - Fisher Chi-square	45.0587***	38.7498***	56.7288***	29.9640*	30.9480*	30.2937*
PP - Fisher Chi-square	42.7915***	61.1986***	43.9707***	38.5969***	38.8360***	35.2560**

We estimate equation 2 by using pooled OLS panel regression (see Table 2). In column (1), (2), (3) and (4) concern the estimation of the model by using three measures of inequality in education: the Gini index of all, men and women compare with the average year of total schooling. The findings indicate that the effect of the gross capital share is negative but insignificant irrespective of the chosen measure of inequality in education. However, the average year of schooling show the significantly positive impact on economic growth. This because high level of education lead to high skilled of labour and hence increase in productivity and income.

Table 2. The result of estimating panel regression model by pooled OLS method

Dependent variable: GDP per capita	(1)	(2)	(3)	(4)
Gross capital share	-0.7463254 (0.5826863)	-0.1713559 (0.7452019)	0.7055606 (0.8352339)	-0.4772472 (0.7161073)
Year of schooling	2.378138*** (0.1512023)			
<u>Gini^{all}</u>		-6.81795*** (0.6336599)		
<u>Gini^{men}</u>			-6.990575*** (0.8528739)	
<u>Gini^{women}</u>				-5.88522*** (0.5033174)
Constant	7.527522*** (0.5238933)	14.15788 *** (0.5997478)	13.70004*** (0.6498698)	14.07802*** (0.5589888)
AIC	135.825	176.9853	200.5205	167.995

*** p-value < 0.01, ** p-value < 0.05

The most important results of this model is the educational inequality effect. The results appear to suggest that the negative impacts of the Gini index are robust for all three model. There are several explanations of the negative impact of inequality in education on economic growth. For instance, Klasen and Lamanna (2008) mentioned that such gender inequality reduces the average amount of human capital in a society and thus harms economic performance.

Moreover, the results show that educational inequality has greater impact on economic growth than gross capital share, and average year of schooling, especially educational inequality in men. This results imply that educated male workers contribute more on economic growth. One possible explanation is that women are less likely than men to participate in the labour market. It is clearly that there is considerably more variation across developing countries in labour force participation by women than by men. Amin (2011) also found that labour productivity and firm-size are lower for female-owned business in Latin America. Similarly, Petersen, Snartland and Milgrom (2006) revealed that women are slightly less productive than men in blue-collar manufacturing occupations. However, a number of studies experienced in different results. For example, Quisumbing (1996) confirmed that, in agricultural sector, female farmers are equally efficient as male farmers. Okoye and Ukoha (2008) found that women were more labour productive than their male counterparts in cassava production in Nigeria. However, in ASEAN member countries, there is still no evidence that male workers have more productivity than female workers.

Conclusion

This paper examines the impact of inequality in education on economic growth of ASEAN member countries using pooled panel OLS regression model. The data consist of real GDP per capita at constant 2005 national prices, share of gross capital formation at current PPPs, average year of total schooling and Gini coefficient of education according to the criteria of gender that constructed by applying Thomas, Wang and Fan (2002) formula. All the data are calculated in 5-year averages from 1970-2010 in 10 ASEAN member countries. The results show that the educational inequality plays more important role on economic growth than years of schooling. Moreover, educational inequality in men has greater impact than women and overall. This implies that educated male workers may contribute more on economic growth than educated female workers in ASEAN country members.

These results have strong implications in terms of economic policy. When a number of researches are carried out in these areas and into the recommendations made here, it might be possible for ASEAN country members to put an effort on reducing inequalities in education, especially in men. At the same time, encouraging educated women to participate in working may result in an increase in economic growth. Finally, the most important implication is that, in ASEAN member countries, education policies should be developed consistent with the needs identified as different countries face the different challenges. Therefore, the implementation of education policies such as those will more likely to influence on economic growth.

References

- Amin, M. (2011). *Labor Productivity, Firm-size and Gender: The Case of Informal Firms in Latin America (Short Note)*. Mimeograph (2011).
- Barro, Robert J., and Lee, J. W. (1993). *International Comparisons of Educational Attainment*. *Journal of Monetary Economics*; 32, no.3 (December 93). 363-394.
- Barro, Robert J., and Lee, J. W. (1997). *International Measures of Schooling Years and Schooling Quality*. *American Economic Review; Papers and Proceedings*, 86(2), pp. 218-223.
- Cecchi, D. (2004). *Does Educational Achievement Help to Explain Income Inequality?* In A. Cornia (Eds.), *Inequality, Growth and Poverty in an Era of Liberalization and Globalization*, Chapter 4. Oxford University Press. <http://dx.doi.org/10.1093/0199271410.003.0004>
- Khayria, K., and Feki, R. (2015) *Gender Inequality and Economic Development*. *Business and Economics Journal* Volume 6, Issue 4.
- Klasen, S. (1999). *Does Gender Inequality Reduce Growth and Development?* World Bank Policy Research Department, Working Paper 7, World Bank: Washington DC.
- Klasen, S., and Lamanna, F. (2008). *The Impact of Gender Inequality in Education and Employment on Economic Growth in Developing Countries: Updates and Extensions*. EUDN Working Paper 2008–10 (Namur, Belgium: European Development Research Network).
- Lopez, R., Thomas, V., & Wang, Y. (1998). *Addressing the Education Puzzle: The Distribution of Education and Economic Reform*. World Bank Policy Research Working Paper no.2031.
- Mitra, A., Bang, J., and Biswas A. (2015). *Gender Equality and Economic Growth: Is it Equality of Opportunity or Equality of Outcomes?* *Feminist Economics* Volume 21, 2015 - Issue 1.

- Okoye, B.C., and Ukoha, O.O. (2008). *Gender Differentials in Labour Productivity among Small-Holder Cassava Farmers in Ideato Local Government Area of Imo State, Nigeria*. MPRA Paper, University Library of Munich, Germany.
- Petersen, T., Snartland, V., and Milgrom, E.M.M. (2006). *Are Female Workers Less Productive Than Male Workers?*. Research in Social Stratification and Mobility.
- Quisumbing, A. R. (1996). *Male-female differences in agricultural productivity: Methodological issues and empirical evidence*. World Development Volume 24, Issue 10, October 1996, Pages 1579–1595
- Sadiman, A.S., (2004) *Challenges in Education in Southeast Asia*, Paper presented at the International Seminar on “Towards Cross Border Cooperation between South and Southeast Asia: The Importance of India’s North East Playing Bridge and Buffer Role”, Kaziranga, India, 16-19 November 2004.
- Thomas, V., Wang, Y., and Fan, X. (2000). *Measuring Education Inequality: Gini Coefficients of Education*, World Bank Policy Research Working Paper, no. WPS2525.
- Thomas, V., Wang, Y., and Fan, X. (2002). *A New Dataset on Inequality in Education: Gini and Theil Indices of Schooling for 140 Countries, 1960–2000*. The World Bank, Washington.
- UN (2010) Human Development Report 20th anniversary edition by the United Nations Development Programme (UNDP).