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THE EFFECT OF EDUCATION ON INCOME INEQUALITY IN SELECTED ISLAMIC COUNTRIES

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ABSTRACT

The impact of education on income inequality remains a challenging issue at the core of economic debates. The present study attempts to investigate the effect of income inequality in a selection of Islamic countries during 1990–2013. Method of panel data has been implemented, and the fixed effects are examined against the random ones by the Hausman test. The impacts of gross domestic product (GDP) and training at primary, secondary and university levels on income inequality is investigated in the selected Islamic countries. Findings indicate that the enrolment rate in primary and secondary schools has a significant negative effect on income inequality, and the enrolment rate in university has a significant positive effect on income inequality. Thus, training in primary and secondary schools might reduce income inequality, and education in universities can increase income inequality because of the higher financial capability of certain classes of people and the expertise they have acquired. Likewise, the Kuznets inverted-U hypothesis is approved due to the positive and statistically significant estimated coefficient of

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income and negative and significant of its squared value. This finding indicates that in the first steps of economic growth, income distribution is more unequal and this inequality is gradually reduced until finally after the fulfilment of economic growth and development, the income distribution turns toward equality.

Keywords: Education, income inequality, Gini coefficient, Islamic countries, panel data

JEL Classification: A2, O15, D63, C23

INTRODUCTION

Income inequality is an unfavourable phenomenon, and the reduction or elimination of such a problem is one of the socioeconomic goals of most countries. The effect of education on income inequality has remained a challenging issue, and numerous studies during recent decades have been carried out. However, results are still conflicting. Economic policy makers have concentrated on economic growth during the 1950s because it was assumed that any increase in the level of production would cause a larger per capita income of society. However, before production increment, and consequently before the benefits of economic growth increases, which would be attained by the individuals of lower income or poor people, the existing resources shall be focused by a special group of people in order to be dedicated for investment and production. The reason behind this idea is that people with more wealth save more money than those with less, and the accumulation of savings makes investment and economic growth possible (Todaro and Stephen 2012: 282).

During the last recent decades, the issue of a causal relationship between poverty and education, and consequently the effect of training and education on the distribution of income, has been noticed by economists. In this regard, the opponents of human capital theory believe that the best way to improve the distribution of incomes in the long run is to invest in human capital. It is believed that the economic structures would be changed for better balancing and distribution of income, and one of the paths toward evolution of these structures is investment in the training and learning of vocational skills. Becker and Chiswick (1966) believe that investing in education can result in better balancing of the distribution of income. On the other hand, using income function, Mincer (1970) argues that in addition to basic income, which does not depend on education, the income of each person is influenced by investment on education. As the rate of investing in education and its outcome rate increases, personal income rises as well.

Becker and Chiswick (1966) and Mincer (1970) both believe that education for the purpose of improving skill level provides an escalation in personal and social income and decreases the dispersion of income distribution. Human capital is raised among lower-income individuals by education and training, and they can improve their quality of life through learning more skills. Sakharopolos and Woodhall (1991) consider education an investment in the sense that education can help to develop the economy in ways similar to other investments in human capital, and it may increase the assets of those with low income just the same as investing in physical capital. Since high-income levels of society impart and enjoy education to a greater extent than low-income classes, the issue of whether education and its related expenses might result in better distribution of income or not has always been a question. Some of the studies conducted in this regard represent conflicting results. If policies of increasing the level of education perform in such a way that primarily only high-income persons can access it, then studying at advanced levels might only result in higher income for the already wealthy. Therefore, the expenditures of higher education (which are partly paid by the government) may become available only for this group of people and as a result, both governments and the wealthy pave the way for increasing the inequality of income. Nevertheless, if higher education levels were funded by government expenditures as with primary and secondary school, which are government-funded in most of the examined countries, then the level of education available can be an approach to reducing poverty and income inequality.

Since the 1950s, a person's expertise and skill have been regarded as important factors in increasing the efficiency and productivity of physical capital, and education has now been introduced as the most effective method in human investment and origins of human capital. Due to the existing literature, not many studies have been conducted on the effect of education-level disparity on income inequality. Thus, the current study attempts to answer the question of how education can influence income inequality. On an individual basis, the skills acquired from education and training may enable a person to earn a higher income. In addition, education might allow the person to derive various psychological benefits, achieving higher social facilities, and a higher life expectancy. Additionally, any tendencies toward addiction and criminal activity can decrease as well. By improving the level of education in a society, work force productivity increases, and therefore total output of the economy may increase, while most of the public expenditures may decrease. Thus, one can conclude that improvement in the education of a society can decrease income inequality. The bulk of current literature regarding the impact of education

on income inequality is associated more strongly with developed economies, while few studies have concentrated on developing Islamic countries.

Therefore, the present study seeks to investigate the effect of education on income inequality in a selection of Islamic countries from 1990–2014. Chapterisation of this study is such that the literature review and theoretical bases are represented in the second part. Methodology is introduced in the third section, and after a discussion on the empirical findings, the paper will end with a conclusion and policy implications.

LITERATURE REVIEW

The best focus on education can be found in the work of Adam Smith, who believes that education can result in an increase in persons' abilities and grow their capabilities, such that both the individual and society can benefit from such a situation (Smith 1776). John Stuart Mill indicates that education improves the power of foresight as well as individual refinement conditions (Mill 1848). In his opinion, while educating the labour force can generate great productivity, the workers' potential for productivity and income can be improved. According to Marshall (1961), education and training are considered a national investment because they might be able to make great changes in the people of a society. He argues that all people in a society should be required to pass the general training courses even if the topics are not related to their current jobs. On a theoretical basis, there are multiple channels for training and education to have an impact on income inequality. The first is through the outcome rate of investing in human capital (paying for education) based on individual's ability and the income distribution theory. Becker and Chiswick (1966) believe that if all people invest equally in human capital, the distribution of income shall be the same as their distribution of ability. Therefore, if the distribution of abilities were the same, the incomes would be the same as well. Since persons who are more skilled are those who have been more willing to invest in human capital, the incomes tend to be unequal. The other channel is based on Schultz's (1963) studies. He notes that changes in investing in human capital are a vital factor in the reduction of inequality in people's income distribution. A quick rise in human capital in comparison with a slow rise might result in a more unequal distribution of income. However, Fields (1980) maintains that there is a slightly positive relationship between the average level of education and income inequality. Therefore, the relationship between education and income inequality is positive.

Empirically, there are many studies investigating the effect of education on income distribution. For example, Becker and Chiswick (1966), Chiswick (1971), Tinbergen (1972), Sakharopolos and Woodhall (1991), Lam and Deborah (1991), De Gregorio and Lee (2002), and Checchi (2001) use the mean standard deviation for years of education as the educational index and the Gini coefficient as the index for income inequality. They conclude that there is a positive relationship between education and income inequality. However, Ram (1984), Park (1996) and Digdowiseiso (2009) find no significant relationship between education and income inequality. Pose and Tselios (2009) use the Theil index to estimate income inequality in European Union states. The findings show that greater inequality in education might result in a more unequal distribution of income.

Lin (2007), Jun et al. (2009) and Abdelbaki (2012) investigate the effect of inequality of human capital on income inequality using the Gini coefficient index and concluded that less inequality in training might result in less income inequality. Schultz (1971) treats human capital as a part of the general concept of capital and regards it along with financial capital as supplementary to human capital. He believes that defining the rate of economic growth in the past and personal distribution of income without considering human capital is inadequate and incomplete. Shultz argues that the work force enjoys different qualities, skills and expertise according to the training individuals received and by which one person is distinguished from others. Therefore, it is not possible to perceive the work force as a homogeneous factor, because the quality of each individual differs too greatly according to the level of training acquired in different stages of life. Chenery et al. (1974) study the effect of different factors such as training and education on income inequality in 66 countries by using a cross-sectional analysis.

The findings of this study show that there is a significant positive relationship between education and income inequality. This means that the effect of the enrolment rate in primary schools is significant and larger for increasing the of income share of lower 40 percent, and the effect of the enrolment rate in secondary schools is larger and significant for increasing the income share of middle 40 percent. In a cross-country study examining 1960–1990, Gregorio and Lee (2002) conclude that greater availability of educational facilities and equal distribution of training play important roles in the equal distribution of income. Sylwester (2002) focuses on the effect educational costs play on inequality. Using data from 50 countries, he concludes that countries dedicating more financial resources to general education may face less income inequality in the future, and this effect might be stronger in

Organisation for Economic Co-operation and Development (OECD) countries than in less-developed countries.

Likewise, Behr (2004) investigates the effect of educational expenses or costs on poverty and income distribution in all 50 states in the United States. He concludes that general education expenditures per pupil could help to decrease poverty and inequality. Using cross-sectional data, Wells (2005) surveys the effect of education and training on income inequality, and the results reveal that the relationship between the development level of countries and inequality can be non-linear and in accordance with the Kuznets hypothesis (Kuznets 1955). In addition, the relationship between enrolment growth in high schools and income inequality has been negatively reported. Kafaei and Dorostkar (2007) study the effect of formal education on income distribution in Iran during 1966–2000. The findings reveal that increasing the population's level of literacy might improve income distribution; however, greater dispersion in literacy might worsen the income distribution. Therefore, if the mean literacy level in a society is high, income inequality might improve in that society. Gradstein et al. (2007) study the political economy of education and present a simple pattern existing in Robert Bifulco's book, which is about the relationship between growth and income inequality. The main hypothesis in this pattern is the presence of credit limits, which prevent a family from obtaining a loan for the purposes of children's educational costs. Referring to this pattern, it is finally proven that the financing of general education by the government, in comparison with private education, might decrease income inequality. Moreover, general education may increase economic growth if the final outcome of education for poor families with little education is greater than the final outcome of education for rich families with greater education. Khalkhali et al. (2010) examine the effects of educational structure on income distribution in Iran during 1965–2005. The findings show that different grades of education might reduce income inequality and also that an increase in governmental education, in proportion with private education, might reduce income inequality more. Furthermore, increased education of females might reduce income inequality by a greater margin than increased education of males. Gruber and Stephen (2013) refer to education as the main element of income inequality in developing countries. They empirically show that as the rate of enrolment in primary grades increases in developing countries, income inequality could also increase in such countries. Their findings contradict most of the studies that claim poor people can reduce their gap with rich people by education. Of course, this issue depends on the structure of developing countries. If developing countries focus their educational resources on

elementary students instead of the students in middle or high schools or even universities, the resulting increase in the rate of primary school enrolment might reduce inequality in the next decades. However, what actually occurs is that developing countries spend most of their time and educational costs on students in high schools and universities, which can favour academically-strong students and further increase income inequality. Paweenawat and McNown (2014) study the key components of income inequality in Thailand during 1992–2011. They introduce the variables of per capita income levels and the changes in number of training years as the main factors of income inequality in Thailand and conclude that there is an inverted-U relationship between per capita income levels and income inequality.

The effects of having access to Information Technology (IT) on the income inequality of Kazakhstan have been studied by Tatyana et al. (2015) using the correlation analysis. Findings indicate that income inequality is rooted in varying accessibility to higher education by different income levels. Since such education is hard to achieve by those of lower income levels, it is almost impossible for them to secure the income safety required to step out of poverty. In addition, children of poorer families have less accessibility to educational resources and references than those of wealthier families, and higher education is not economically feasible for them. Campos et al. (2016) examine the effects of education on the income inequality of different provinces of China during 1993–2011. Results imply that religious minorities in comparison with religious majorities, females rather than males, and ruralists compared to urbanised people have less accessibility to education and as a result do not enjoy a higher income. Baliamoune and McGillivary (2015) focus on the generic inequalities of education on the income inequality of northern and Sub-Saharan Africa and Middle Eastern countries. Findings represent a significant negative impact of the educational generic inequalities on income inequalities in the selected countries. Pan (2014) investigates the effects of investment in education on the wage inequalities of skilful and semi-skilful labour as well as economic development in the selected developing countries. Outcomes exhibit reduction of income inequalities along with amplification of investment on education. Turcinkova and Stavkova (2012) examine the relationship between family income and level of education in the Czech Republic. It is found that the low-income or vulnerable groups of society are those with no education or only a primary-level education. In contrast, individuals of higher social status or high-income levels have completed greater academic levels of education.

METHODOLOGY

Panel data model is a method for integration of sectional and time-series data. The advantage of this method is that traditional approaches of econometrics on time-series and sectional data do not consider the heterogeneity of the units or groups, and the results contain a risk of bias. These types of heterogeneity are considered in the panel data model and the estimates are unbiased and consistent. The most important point in utilisation of panel data is to control heterogeneous properties and consider each individual, company, state and country, whereas sectional and time-series studies do not control this heterogeneity, as there is a fear of bias in results by estimation of the pattern with these methods. In fact, identification and measurement of the effects that are not easily identifiable in sectional and time-series data is possible by using panel data (Hsiao 2003). Following the Gruber and Stephen (2013), Paweenawat and McNown (2014), and Gradstein et al. (2007) studies, the function of income inequality is considered as follows:

$$IN = f(Y, EDU) \tag{1}$$

where *IN* refers to income inequality, *Y* stands for income variable, and *EDU* represents the grade of education. Following the previously mentioned studies, a logarithmic form of variables was used; thus, the structural form of this model is as below:

$$\begin{aligned} LIN_{it} = C + B_1 LY_{it} + B_2 LY^2{}_{it} + B_3 LD_{it} + B_4 LED_{it} \\ + B_5 EDU_{it} + \mu_i + \lambda_i + e_t \end{aligned} \tag{2}$$

where *LIN* shows a logarithm of the Gini coefficient as an indicator of income inequality, *LY* represents a logarithm of gross domestic production (GDP), and LY^2 stands for the squared form of *LY*. *LD*, *LED* and *EDU* exhibit logarithmic forms of primary and secondary school and university enrolment correspondingly. In addition, μ_i and λ_i represent fixed effects associated with the selected crosses and time periods relatively. The data of developing countries, except for the Gini coefficient, are extracted from World Databank (WDI) website; data of the Gini coefficient are collected from World Income Inequality Database (WIID). In order to select the "Developing Countries" to be examined, published data by the United Nations Development Program (UNDP) is implemented. UNDP (2014) divided the countries into four groups of very high, high, middle and low human development. In the present study, the countries from high and middle human development groups as developing

countries are selected. The names of these countries, as well as their Human Development Index (HDI) rating and each country's overall HDI rank, are mentioned in this paper's Appendix.

FINDINGS

Following the standard procedure of panel data estimation and before representing the outcomes of the panel data analysis, it is necessary to prove whether or not the selected cross-sections are heterogeneous. In order to shed light on the issue of heterogeneity of crosses, an F-Limer coefficient will be utilised. If the heterogeneity of units is confirmed, the pattern will be estimated by panel data; otherwise, a Pooling Data approach will be implemented (Baltagi 2005: 13). The F-statistic is defined in Equation 3:

$$F = \frac{(RRSS - URSS)/N - 1}{URSS/NT - N - K} \approx F_{[(N-1),(NT-N-K)]} \quad (3)$$

In the equation, *RRSS* stands for the residual sum of the squares of the restricted model, and *URSS* refers to the residual sum of the squares of the unrestricted model. *N* is the number of crosses, *T* is the time interval measured by number of years, and *K* is the number of parameters. The null hypothesis is based on the lack of heterogeneity between crosses, and the alternative hypothesis presents heterogeneity of them. If the estimated F-statistic is larger than the critical value, the null hypothesis is rejected and the regression pattern will be estimated using the panel-estimation approach. The results of the F-Limer test are shown in Table 1, indicating that the null hypothesis is rejected and the presence of heterogeneity in sections by 5 percent reveals that the panel data is suitable for estimation.

Table 1: Results of F-Limer estimation.

Effect test	F-Statistic	Prob.
Cross-section F	30/796	0.0000
Cross-section χ^2	412/451	0.0000

Reference: Research findings

After estimation of the F-Limer statistic, it shall be determined that the estimation error of panel data is either caused by a change in the crosses or is due to the effect of time period. In this case, two types of errors (namely fixed effects and random effects) are considered. In the fixed effect, estimation error refers to a change in the crosses' intercept, but in the random effect model,

errors are considered randomly. Statistically, the residuals of are written as Equation 4:

$$\varepsilon_{it} = \mu_i + \eta_{it} \quad (4)$$

Equation 4 shows one part of the error that is not correlated with the observations, and refers to another part of the error that is related to the crosses and can be correlated with observations. In the fixed effects approach, *s* are correlated with observations, but in the random effects model, *s* are not correlated with observations. The model of random effect assumes that is a random term for each group, but in each time series, among all random distribution of *s*, just one enters into regression pattern equally (Baltagi 2005: 14). In the model of fixed effects, the intercept is different among individuals in the regression model, because each cross or each individual holds its own characteristic. In the model of random effects, it is presumed that the intercept for a single cross is a random selection from a larger population with a fixed mean. Therefore, the single intercept is given as a deviation from this fixed mean (Johnston and Dinardo 1995). In order to select between fixed and random effect models, the Hausman test is applied. This test is represented as follows:

$$W = (b_s\beta_s)'(M_1M_0)^1 (b_s\beta_s) \approx \chi^2(r) \quad (5)$$

In the above equation, r is the number of parameters, W with χ^2 distribution and degrees of freedom equal to the number of parameters in which M_1 is the covariance matrix for fixed effects models' coefficients (b_s), and M_0 is the covariance matrix for random effects models (β_s). If M_1 and M_0 are correlated, b_s and β_s can be significantly different, and it is expected that this case is reflected by the test. The null hypothesis of the Hausman test is based on randomness of statistical data of the model. If the null hypothesis is rejected, randomness of statistical data of the model will be accepted (Hsiao 2003). The results of this test are shown in Table 2. The results indicate that the null hypothesis is rejected and fixed effect is confirmed for the estimation of the model.

Table 2: Results of Hausman test.

Test summary	Chi-sqr statistic	Prob.
Cross-Section Random	10.428	0.0640

Reference: Research findings

In order to make sure that the regression model is not spurious, testing the stationary of the employed variables becomes necessary. If the selected variables are nonstationary, then the cointegration equation must be estimated (Baltagi 2005: 237). To investigate the reliability of the variables in a panel structure, the Im-Pesaran-Shin (IPS) unit root test is employed (Im et al. 2003). According to the null hypothesis testing, some of the crosses might have a unit root. The null hypothesis of the IPS test is based on the presence of a unit root. Results of the stationary test is summarised in Table 3, which is carried out merely by inclusion of constant and secondly through involving constant and trend. According to this table, all variables of the model are integrated of order one. Hence, all correlated variables are the same in degree, and the validity of the regression is verified.

Table 3: Results of IPS unit root test.

Variables	With constant		With constant and trend		Integration order
	t-Statistic	Prob.	t-Statistic	Prob.	
Log (Y)	0.000	−12/954	0.000	−9/188	I(1)
Log (D)	0.000	−9.585	0.000	−6/881	I(1)
Log (ED)	0.000	−11/143	0.000	−14.612	I(1)
Log (EDU)	0.000	−10/890	0.000	−9/289	I(1)

Reference: Research findings

Education at secondary and university levels and the Gini coefficient are considered as the estimating index for income inequality. The results of this model of estimation are reported in Table 4.

Table 4: The empirical results, dependent variable = income inequality.

Variables	Coefficient	t−statistic	Prob.
C	27.880	3.771	0.0002
Log (Y)	1.801	3.342	0.0009
Log $(Y)^2$	−0.033	−3.071	0.0023
Log (D)	−0.125	−2.072	0.0389
Log(ED)	−0.186	−1.754	0.0802
Log(EDU)	0.582	1.946	0.0523
R^2	0.71	–	–
F− Statistic	33.746	–	0.0000

Reference: Research findings

The estimated coefficients of education in primary and secondary school are 0.12 and 0.18 respectively, which are negative and significant. This means education at the primary and secondary levels can reduce income inequality. In fact, education is seen as one of the most effective ways to reduce income inequality. Education creates more economic opportunities, determines the type of job and level of payment available to an individual, and plays a pivotal role as a signal of ability and productivity in the labour market. Education turns nonprofessional human forces into professional ones, and this phenomenon can reduce income inequality in the long run. Studies by Zhang (1996), Blanden and Machin (2004), and Abdollah et al. (2013) confirm this finding as well. Moreover, the computed coefficient for education at the university level is 0.58, which is positive and significant. This finding implies that a university education increases income inequality. The probable reason for such an outcome could be reflected in the positive impact of a university education on the level of skills and professions of individuals. Therefore, firms and institutes must pay higher salaries to entice these better-trained employees over a lower-paid work force that has solely trained in primary and secondary school. This issue might increase income inequality in a society. This finding is in line with other studies such as Acemoglu (2002), Park (1996), and Becker and Chiswick (1966).

According to theoretical bases, it is expected that when income increases in a situation of unfair distribution of wealth, inequality of income will be amplified. As seen in Table 4, the estimated coefficient of income is 1.81, which is positive and significant. It indicates that the distribution of income deteriorates in developing countries after income escalation, meaning that any increase in income leads to an increase in inequality in the mentioned countries. It can be inferred that the income increments during the research period are in favour of high-income earners of society. Moreover, the square coefficient of per capita income, which is used to explain the Kuznets curve, is 0.03, which is negative and significant. Therefore, a Kuznets analysis that indicates income inequality in developing countries might be increased in the elementary stages of growth but might then gradually decrease in the long run is confirmed for the selected countries of the current study. Such outcome is verified in other studies such as Gallup (2012), Dobson and Ramlogan (2009), and Gregorio and Lee (2002).

CONCLUSION

The main aim of the present study is to investigate the effect of training at different levels of education on income inequality in selected developing countries. For this purpose, the relationship between variables of income, education in primary, secondary and university levels, and the Gini coefficient during 1990–2014 is investigated using the panel data model. Findings indicate that income inequality is negatively affected by education in primary and secondary school, and the variable of the square of income and the variable of education at university have a significant positive effect on income distribution. In fact, in line with the Kuznets inverted-U hypothesis, elevated income in the selected countries initially leads to an increase in income inequality, and in the long run it results in unequal income reduction. Regarding the estimated coefficients for education, it must be mentioned that education in primary and secondary school reduces the income gap in the society. General education improves the productivity of low-income persons, because it improves their condition in the market. As a result, the gaps in income and welfare can be reduced by education and consequently, primary and secondary education can positively influence the development process of a country. However, university education increases the gap between different classes of people due to increasing expertise and related compensation of those individuals. Of course, if the structure of higher education performs in such a way that mainly high-income people can take advantage of it, then training and education at university levels might lead only to the attainment of greater education and income by people of that same income level. Because the costs of higher education are partly provided by governments, it might be at the disposal of high-income individuals, and both parties might pave the way for an increase of income inequality. However, if higher education were funded by governments just as primary and secondary schools are in most countries, then this might be a path to decreasing poverty and income inequality.

POLICY IMPLICATION

Taking this study into account, it is recommended that governments in developing countries apply more incentive policies related to training and education to increase the level of literacy in their societies. Simultaneously, more facilities for university and other higher education should be considered

in such a way that even lower-income individuals can enjoy education and training services. In this way, the increase in income inequality will be prevented.

NOTES

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APPENDIX

List of selected Islamic countries.

No	Country	Human Development Index (HDI)	HDI rank
1	Malaysia	0.769	64
2	Kyrgyzstan	0.754	69
3	Iran	0.742	76
4	Azerbaijan	0.734	82
5	Turkey	0.722	90
6	Tunisia	0.712	94
7	Jordan	0.700	100
8	Egypt	0.662	112
9	Uzbekistan	0.654	114
10	Indonesia	0.629	121
11	Tajikistan	0.622	125
12	Kyrgyzstan	0.622	125
13	Morocco	0.591	130
14	Bangladesh	0.515	146
15	Pakistan	0.515	146