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ABSTRACT

The main objective of this paper has been to investigate macroeconomic factors influencing the schooling inequality across 69 countries during the period of 1975 to 2005 with five-year intervals period. Relying on 201 observations, we found that education expansion, ratio of capital to GDP, and ratio of female to male primary enrollment statistically significantly play as powerful equalizers in education distribution .Previous-year educational inequality, per capita real income, and growth rate of rural population play as significant disequalizers of educational inequality. There are two major findings. Firstly we found that factors directly involved to schooling like enrolment rate or education expenditures are not significant while the factors indirectly involved to schooling have significant impacts on educational inequality. Secondly, we found quadratic (U-shape) relationship between rural growth rate and educational inequality. So the higher rural population growth rate brings increasing or decreasing of educational inequality with turning point at rate -1.39.

Keywords: Schooling inequality, education expansion, Gini coefficients
JEL classification Codes: I24

1. INTRODUCTION

> " Education is the key to creating, adapting and spreading knowledge… But the gains in access to education have been unevenly distributed, with the poor seldom getting their fair of share."
>
> World Bank, World Development Report, 1998/99

The purpose of this paper is to investigate macroeconomic factors influencing a country's equality in educational attainments for the period of 1975 to 2005. Nowadays, equal access to education is basic rights that everyone should gain and the public push towards making school attendance compulsory in the most countries around the World but inequality in education still remains.

There is a difference between equality and equity in education. The meaning of the former is all citizens should be treated the same with regard to certain schooling or equal access to education. Differing from the equality in education, the meaning of equity in education has two dimensions which are fair and inclusive education. The former means that "making sure those personal and social circumstances should not be an obstacle to achieving educational potential" and the latter is defined as ensuring a basic minimum standard of education for all"(OECD, 2008, p. 2). From the specifications of both, the equality in education is important for input of schooling while the equity in education is important for process and output of schooling.

Notice in addition that equality in education is different from equality in educational opportunity[1]. Blaug (1972) explained clearly the meaning of equality of educational opportunities as following;

> Equality of educational opportunities is a somewhat ambiguous concept. Does it mean (a) equal amounts of education for everyone, (b) education sufficient to bring everyone to a given standard or (c) education sufficient to permit everyone to reach their endowed potential? No country has adopted the first interpretation at all levels of education. The second interpretation is sufficient to account for compulsory attendance laws but is of no help in making decisions about education above the minimum prescribed level. The third no doubt corresponds to the everyday meaning of 'equality of educational opportunities' (pp. 115-116).

[1] Blaug (1972) mentioned that no necessary relationship exists between the degree of inequality and the degree of inequality of opportunity.

Equality in educational attainments is criticized for being focused solely on the quantity dimension while neglecting the equality of the quality of education. The situation often takes place in developing countries especially with the poor. Equal educational accessibility is the first fortification to release their citizens from illiteracy.

The driving forces determine educational inequality by two-sided main elements. One is describing the household behavior as the demand of schooling and the other is government provision as the supply of schooling (Checchi, 2006).

Since equality between the rich and the poor within education markets necessitates government intervention, macro-policy implication should take into account all significant determinants of educational inequalities. In this study, we are focusing on analyses of important macroeconomic factors determining the levels of educational inequalities. Although most countries have already passed the law of compulsory education to solve literacy problem, governments are still expected to put the law into practice viably.

Understanding historical trends of educational inequality in the World economy, Morrisson and Murtin (2007) pointed out the dramatically decreasing trends of the World inequality in years of schooling from 1870 and the consequent crucial reduction of the illiteracy. The Gini coefficients of educational inequality have decreased over 50 per cent (from 0.8 to 0.4).

This paper is organized into five sections. In the next section we review the relevant empirical literatures supporting the analysis. Section 3 presents measure of educational inequality and further looks the World trends of educational inequality over period 1950 to 2010. Section 4 present determinants of educational inequality. Section 5, the last section, concludes the article.

2. LITERATURE REVIEW

Model of human capital by Becker (1975) explained the individually different levels of the total amount invested in human capital due to differences in demand and supply conditions with two controversial approaches; 'Egalitarian' and 'Elite'. The former believes the level of investment in education is varied because of the differences in environment (supply side) while the latter believes the different levels of investment in education is from the differences in abilities.

Differing from the model of human capital, Checchi (2006) investigates the determinants of enrollment ratio at the different stages of education. The factors are from both sides; household behavior as the demand for schooling, and government provision of the public service as the supply of schooling. The negative relationship between Gini index of income distribution and enrollment rate is found out.

The relationship between schooling and its inequality is dualistic due to measurement of inequality. Basically, there are two measures of dispersion; absolute and relative that are applied for examining inequality in education. The difference between two measures seems to impact the relationship between schooling and its inequality. Ram (1990), De Gregorio and Lee (2002), and Lim and Tang (2008) apply the standard deviation of schooling to measure schooling dispersion and reveal the existence of concave relation between them. The negative monotonic relationship between them is found out by Thomas et al. (2000), Checchi (2001), Castelló and Domenéch (2002), and Lim and Tang (2008) because all of these studies employ Gini index of education to measure education dispersion.

Gregorio and Lee (2002) analyzed the determinants of educational inequality (standard deviations of average years of schooling) across countries and over time. By incorporating the Kuznets relationship between educational attainment and educational inequality according to initial level of education, they found that the government social expenditure plays an important role as an equalizer reducing the inequality in education.

3. INEQUALITY IN EDUCATION ATTAINMENT

3.1 A specification of measuring in educational inequality

This paper chooses the Gini index of inequality as a measure of inequality in educational attainment. The specification of the Gini coefficients, a relative measure of the distribution of educational attainment (G_{educ}) is obtained from Thomas et al. (2000, 2002), Checchi (2001), and Castelló & Domenéch (2002). This general formulation is adapted from a measure of Gini coefficients of income distribution for the purpose of aggregate macroeconomic data. The specification is as follow[2];

$$G_{educ} = \frac{1}{2\mu} \sum_{h=0}^{3} \sum_{k=0}^{3} |y_h - y_k| \; n_h \, n_k \qquad (3.1)$$

Where the subscripts h and k correspond to the different four levels of educational attainments: no schooling (0), primary (1), secondary (2), and tertiary levels of schooling (3); μ is average years of schooling in the corresponding total/female population over 15 years of age; n_h and n_k represent the proportions

[2] The measure of educational Gini coefficients which present in equation 2 is in common form. Castelló & Domenéch (2002) expanded the expression into easy-use form which can apply for four levels of education only; no schooling, primary, secondary, and tertiary levels of schooling.

of the corresponding population with determinate levels of education; y_h and y_k are the cumulative average years of schooling at each level of educational attainment, define $y_0 \equiv 0$, $y_1 \equiv s_1$, $y_2 \equiv s_1 + s_2$, $y_3 \equiv s_1 + s_2 + s_3$, where s_1, s_2, and s_3 defined as average schooling years of each educational levels in each proportion of corresponding populations who achieve that level of education; primary, secondary, and tertiary respectively. The Gini coefficients of inequalities in educational attainments are presented in the appendix B (table B-1 and table B-2).

3.2 A further look of schooling and its inequality

In the previous sub-section, we describe the specification of Gini coefficients of schooling inequality. In the second sub-section, we further look into a transition of schooling inequality across 146 countries from 1950 to 2010 with five-year intervals period.

Based on education data from Barro and Lee (2011), the proportion of population without schooling has dramatically declined over the period 1950 to 2010. In addition, in year 2010, there is none of population with no schooling or the proportion of population without education approaches to be zero in most advanced-economy countries. Not only the case of population without schooling, but also the case of population with primary schooling, the proportion of population with highest primary level of education attained has become less over time in advanced-economy countries. There is still a huge proportion of population with highest primary level of education attained in Sub-Saharan Africa countries (over 40 per cent of total population).

From the calculations of schooling Gini coefficients referring in Appendix B, the overall trends of inequality in educational attainment are in downward slope for both total and female population groups as same as mentioning in the earlier studies. With a deep focus on each country of the World over time, we found that there are many patterns of changing in educational inequality. The Gini coefficients of educational inequality have obviously declined in developing countries while some developed countries like Belgium, Hungary or Sweden have inverted U-shape trend of schooling inequality. Thus, the government provision plays more important role of better distribution of education rather than individual abilities in developing countries while individual abilities are more crucial in developed countries rather than the government support.

We further look into the correlation between education expansion and its inequality across country over the time. The specification of the simple linear relationship is mentioned as follows;

$$G_{EDUCit} = \beta_0 + \beta_1 S_{it} + u_{it} \qquad (3.2)$$

Where G_{EDUCit} presents Gini coefficients of education distribution in country *i* at time *t*; S presents average years of schooling; *u* is an error term. β_0 is an intercept of equation which represents Gini index in the case of zero average year of schooling. The intercept is expected to have a positive value between zero and one. β_1 represents the slope of equation or marginality of average years of schooling on education Gini index. The coefficient implies that if we increasingly expand average years of schooling one more year, education inequality decreases by β_1 units. The sign of the coefficient is expected to be negative.

The simple regression which presented in table 3-1, describes that marginal increasing in average years of schooling in total population can decrease the Gini coefficients of education distribution 7.3 per cent. Furthermore the impact of education expansion on educational inequality is stronger in female population which is 7.8 per cent.

Table 3-1: Regressions of educational Gini coefficients, pooled OLS, 1950 - 2010

Gini coefficients of schooling	Female	Total
Schooling	-0.078	-0.073
	(-95.40)	(-91.95)
Constant	0.842	0.811
	(171.90)	(162.41)
Adjusted R^2	0.828	0.817
Number of observation	1898	1898

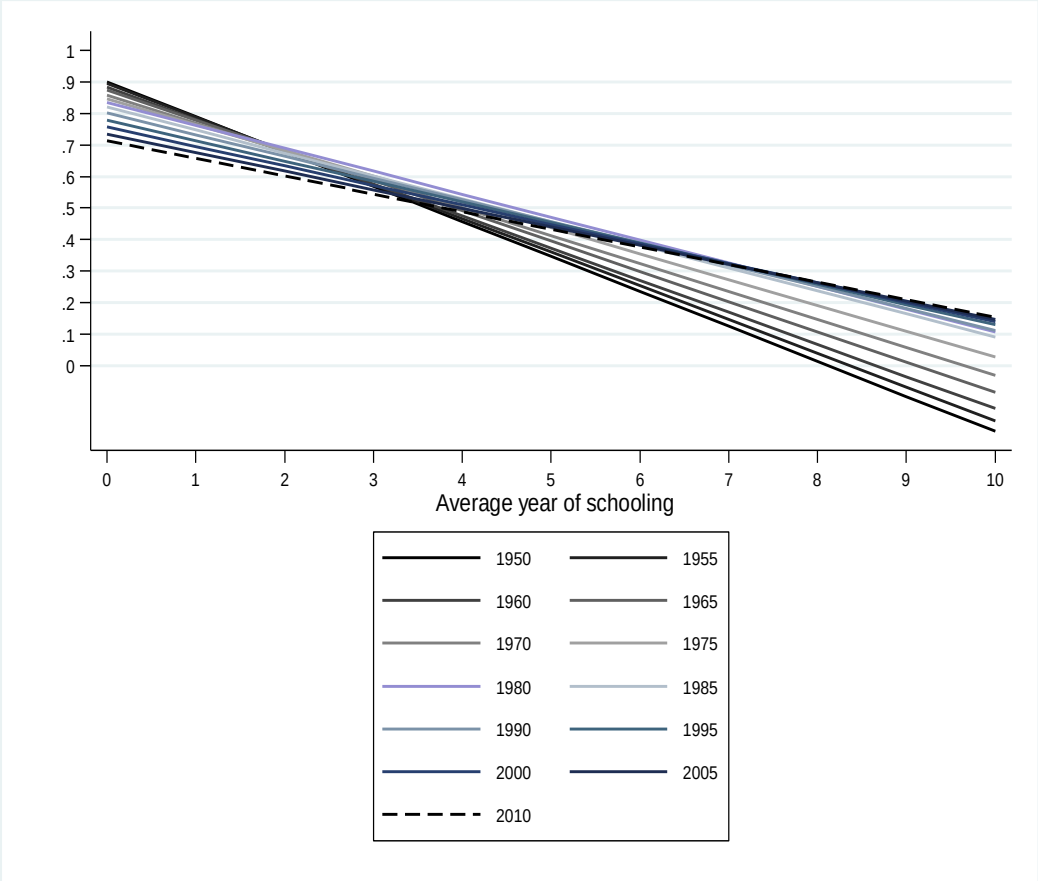
Note: t-statistics are reported in the parentheses. The results from Barro and Lee are in five-year-intervals from 1950-2010. All coefficients are significantly at 99.9% level of significance.

We look in depth of the transition of education expansion and its inequality time to time. The results of cross-section regressions of 146 observations in table 3-2 present lower intercept from 1950 to 2010 (from 0.901 to 0.713) and smaller slope of education expansion which means the effect of education expansion is weaker when the time passes. The results of estimations in table 3-2 are brought to plot graphs which are shown in figure 3-1 (for total population) and figure 3-2 (for female population). Both figures describe the similar transition of education expansion and its inequality from 1950 to 2010. The transition shows that the World economy has more equality in education across countries. Especially in Sub-Saharan African countries and less developed countries, the seriously decreasing in educational inequality is found. We cannot overlook an important

role of international aids in those countries. The flow of international aids makes the reducing of educational inequality which explains a lower intercept.

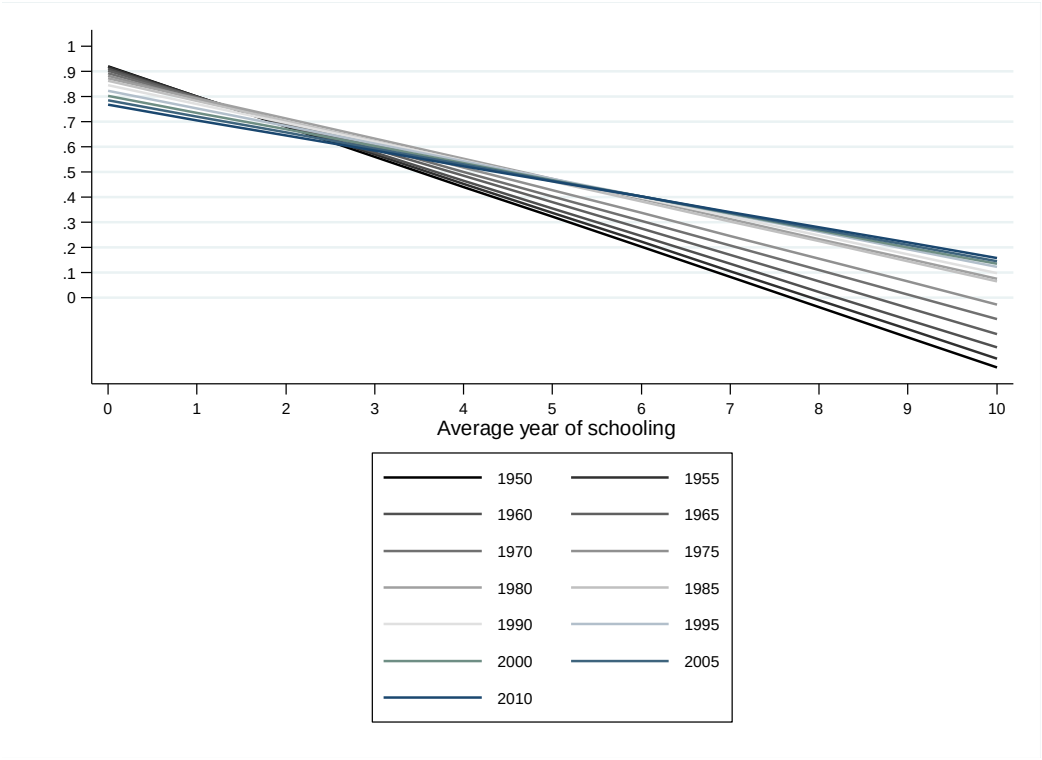
Why has the rotation of graph happened over the period? The more horizontal rotation implies the better equality in education. The explanation of phenomena is the average years of schooling have increased from the increasing of higher secondary enrolment rate from 1970 to 2010 instead of increasing of higher schooling enrolment ratio during 1970 to 1995 which presents in figure 3-3.

Figure 3-1: Transition of education expansion on educational inequality in total population



Source: graph by Author
Note: The straight lines come from the OLS estimations in table 3.2

Figure 3-2: Transition of education expansion on educational inequality in female population



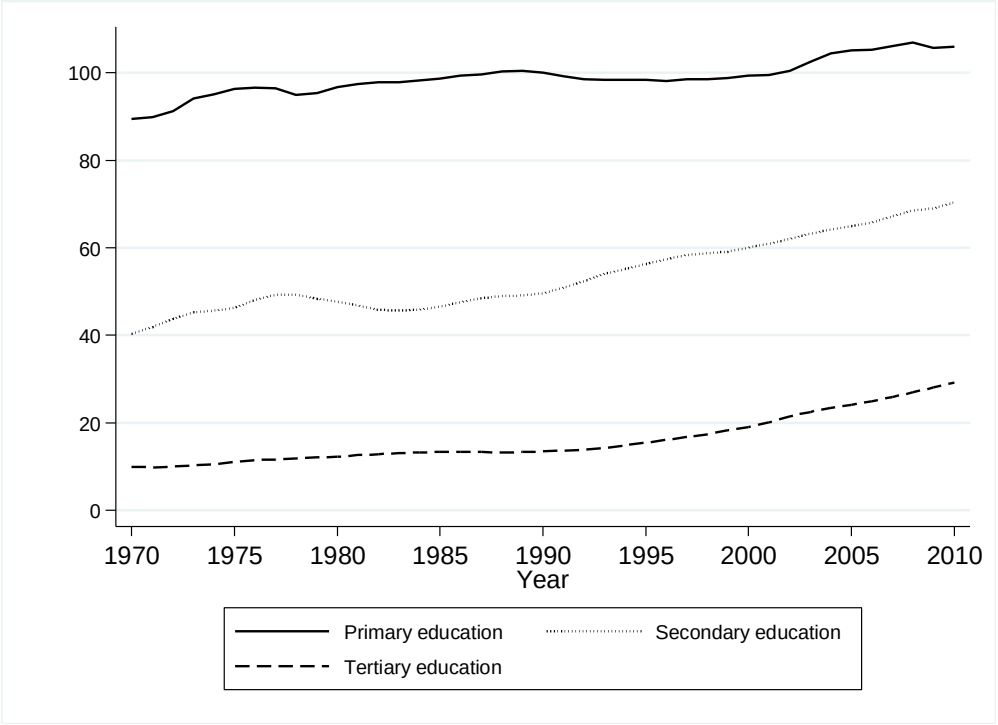
Source: graph by Author
Note: The straight lines come from the OLS estimations in table 3.2

Table 3-2: Cross-section regressions of educational inequality: OLS estimation

	Education Gini												
	1950	**1955**	**1960**	**1965**	**1970**	**1975**	**1980**	**1985**	**1990**	**1995**	**2000**	**2005**	**2010**
Total Population													
Schooling	**-0.111**	**-0.107**	**-0.102**	**-0.096**	**-0.089**	**-0.082**	**-0.078**	**-0.073**	**-0.069**	**-0.065**	**-0.062**	**-0.059**	**-0.056**
	(-27.79)	(-27.74)	(-27.40)	(-28.75)	(-27.80)	(-28.30)	(-28.97)	(-28.61)	(-27.12)	(-26.66)	(-25.42)	(-24.64)	(-23.49)
Constants	**0.901**	**0.895**	**0.883**	**0.875**	**0.858**	**0.847**	**0.836**	**0.821**	**0.802**	**0.779**	**0.758**	**0.735**	**0.713**
	(58.18)	(56.89)	(55.01)	(56.29)	(52.77)	(52.09)	(51.12)	(48.99)	(45.09)	(42.88)	(39.78)	(37.44)	(34.98)
Adj R^2	0.842	0.841	0.838	0.851	0.842	0.847	0.853	0.849	0.835	0.830	0.817	0.807	0.792
No. of Obs	146	146	146	146	146	146	146	146	146	146	146	146	146
Female Population													
Schooling	**-0.120**	**-0.116**	**-0.111**	**-0.105**	**-0.098**	**-0.091**	**-0.085**	**-0.080**	**-0.075**	**-0.070**	**-0.067**	**-0.064**	**-0.061**
	(-29.19)	(-29.22)	(-29.34)	(-31.13)	(-30.94)	(-31.63)	(-32.17)	(-32.51)	(-31.04)	(-29.81)	(-28.53)	(-28.06)	(-26.90)
Constants	**0.921**	**0.917**	**0.910**	**0.904**	**0.893**	**0.882**	**0.873**	**0.863**	**0.846**	**0.822**	**0.803**	**0.785**	**0.767**
	(62.61)	(61.32)	(60.10)	(62.07)	(59.73)	(59.29)	(57.84)	(56.57)	(52.22)	(48.54)	(45.15)	(42.96)	(40.23)
Adj R^2	0.854	0.855	0.856	0.869	0.868	0.873	0.877	0.879	0.869	0.860	0.850	0.844	0.833
No. of Obs	146	146	146	146	146	146	146	146	146	146	146	146	146

Note: t-statistics are reported in the parentheses. All coefficients are significantly different from zero at 0.1% level of significance.

Figure 3-3: The percentage of enrolment ratio



Source: Graph by Author based on World Bank's data

4. DETERMINANTS OF EDUCATIONAL INEQUALITY

4.1 Framework for the Determination of Inequality in Educational Attainments

In this sub-section, we investigate the determinants of inequality in educational attainment. The specification of econometric model is as follows;

$$G_{EDUCit} = \alpha_{it} + \beta X_{i,t-T} + \gamma Z_{it} + u_{it} + e_{it} \qquad (4.1)$$

Where the subscripts i and t are the country and the time period of the panel severally; T refers to a time lag, taken to be five years; G_{EDUC} is the standard indicator of inequality in educational attainment – the Gini coefficients of the distribution of corresponding (total and female) population's educational attainments, where zero means everybody has the same highest level of schooling that individuals attain (perfect equality) and unity means only one individual accesses to education and others are unable to access to formal education or

without schooling (perfect inequality); X is a vector of the five-year lagged explanatory variables are taken in account for estimation which includes two variables – lagged dependent variable and lagged income inequality (measure by the Gini index of income distribution). Past educational and income inequalities are focused to affect future educational inequality (Gregorio and Lee, 2002); Z is a vector of ten current-year independent variables which comprises (1) educational factors; average years of schooling and primary enrolment rate, (2) demographic factors; fertility rate and annual rural population growth rate, (3) social environment factors; life expectancy and gender disparity (ratio of female to male primary enrolment), these variables explain the household behavior or demand for schooling, (4) ratio of public spending on education to GDP as Government support on education or supply of schooling, (5) ratio of capital to GDP describing the demand for skilled workers in the labor market, and last but not least, (6) GDP annual growth rate and per capita real income are contained as control variables for the stage of economic development process; u is a time-invariant country's fixed effect; and e is an error term.

We avoid the misspecification of the equation by constructing scatterplots of correlations between independent and dependent variables which are shown in Appendix D for simply observing the linear relationship. We notice that firstly as in the previous section, there is a negative linear relationship[3] between average years of schooling and educational inequality which is delineated by figure 4-1 and figure 4-2. So we expected a negative coefficient of education expansion on educational inequality. Secondly, we point out the positive linear relationship between schooling inequality in the previous year and the schooling inequality in the current year which is shown in figure 4-3 and 4-4. Lastly, surprisingly, we notice a nonlinear relationship between rural growth rate and the Gini coefficients of education distribution which are shown in figure 4-5 and figure 4-6. So we increase the square of the independent variable into account. Since the data range of rural population growth rate is from negative to positive values (minimum is -5.485 and maximum is 3.113), we expected the positive coefficients of both variables of rural population growth rate.

For other explanatory variables out of figure picking up, income inequality in previous year is expected as the disequalizer of educational inequality (positive relationship). On the contrary, primary enrolment rate, gender parity, education expenditure, and capital are expected to be the equalizer of educational inequality (negative relationship).

[3]Gregorio and Lee (2002) found the nonlinear (inverted-U shape) relationship between educational attainment and educational inequality (standard deviations of schooling) with the turning points of 4.2 years.

Figure 4-1: Scatterplot of average years of schooling and inequality in education: total population

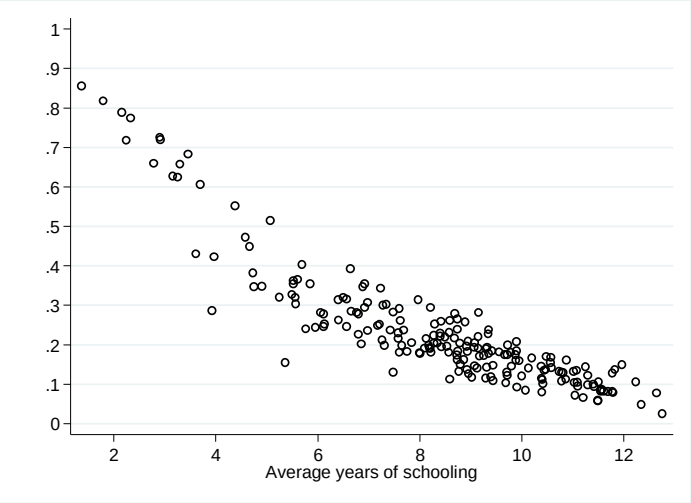


Figure 4-2: Scatterplot of average years of schooling and inequality in education: female population

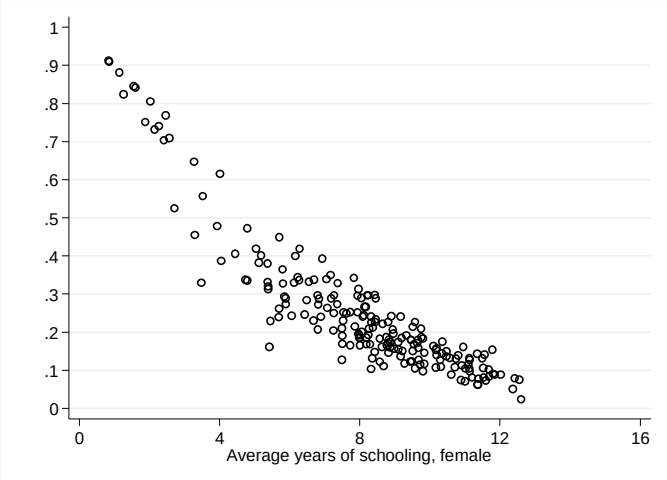


Figure 4-3: Scatterplot of past and current inequalities in education: total population

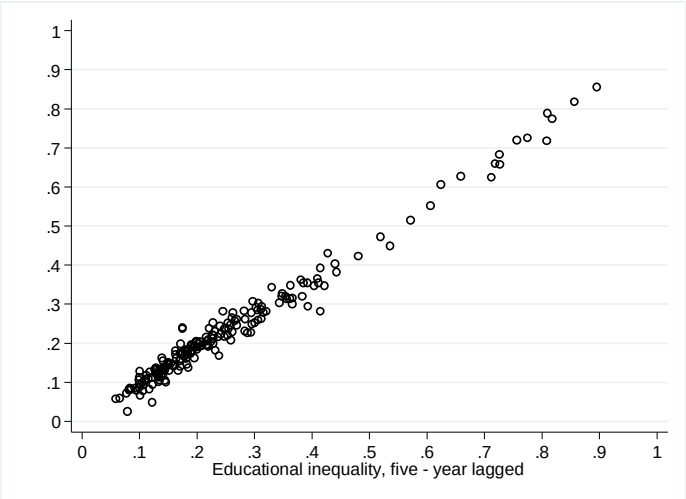


Figure 4-4: Scatterplot of past and current inequalities in education: female population

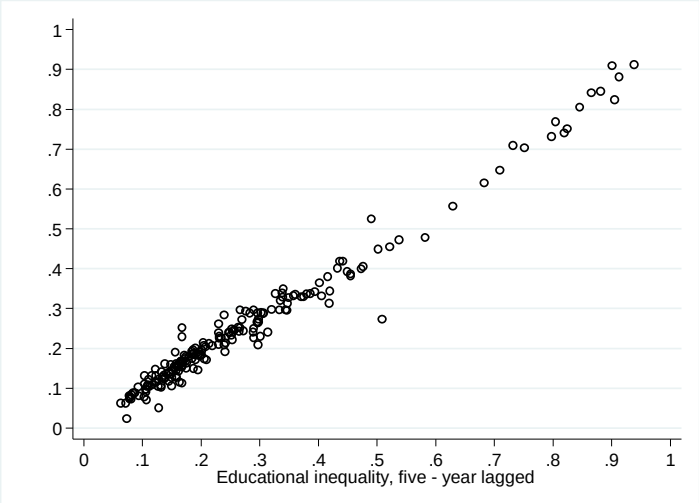


Figure 4-5: Scatterplot of rural population growth rate and current inequality in education: total population

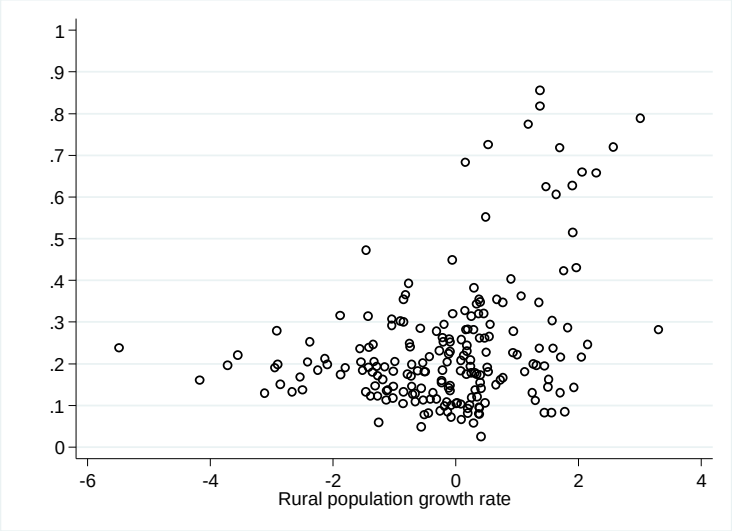
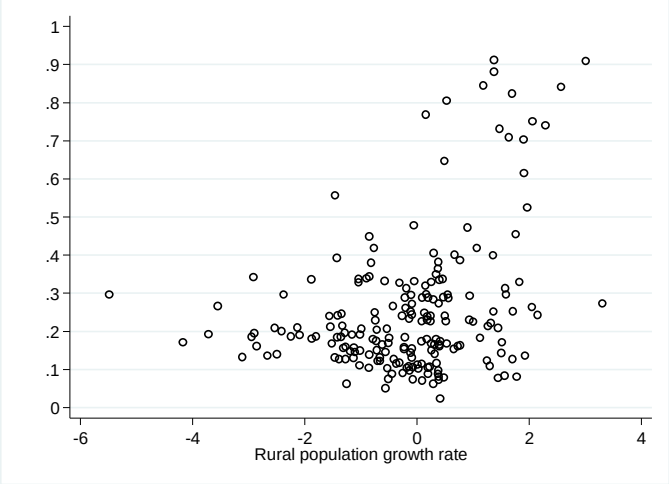


Figure 4-6: Scatterplot of rural population growth rate and current inequality in education: female population



Source: figure 4-1 to 4-6 are constructed by Author

4.2 Empirical results of determinants of education inequality

In this section, determinants of inequality in educational attainment are examined. The data are in the unbalanced panel referring to 69 countries for the period 1975 to 2005, five-year intervals period. We rely on 201 observations (average 2.9 observations per country)[4]. Descriptive statistics of all variables are reported in Appendix C.

Table 3 contains the results of three regressions. The difference between model 1 and model 2&3 is the dependent variables. The former use the Gini coefficients of schooling distribution of total population age 15 years and over as the explained variable while the latter uses the educational Gini coefficients for female population in the same range of age as the regressand.

Concentrating on the result of regression of model 1, we find the strong effect of five-year lagged educational inequality on the current educational inequality. On the other hand, there is insignificant positive effect of five-year lagged income inequality although the coefficient is positive as we previously expected. Hence the effect of educational inequality seems to be long lasting persistent compare to the effect of past income inequality.

On other factors on the demand side for schooling, fertility rate, annual rural population growth rate, and ratio of female to male primary enrollment weakly significantly affect schooling inequality while there is an insignificant effect of life expectancy.

Fertility rate is negatively associated to educational inequality. Bigger number of family member increase better education distribution due to supportive effect among family members (Checchi, 2006). Ratio of female to male primary enrolment is also negatively correlated to educational inequality. This presents the availability of disparity in gender. The better parity in gender brings the greater equality in education.

Expectedly, importantly, the result confirms the quadratic (U-shape) relationship between rural growth rates and schooling inequality (the coefficients of rural population growth rate and square of rural population growth rate are positive and statistically significant). This implies that the higher rate of rural population growth decreases and increases the educational inequality depends on the initial growth rate of rural population with turning point -1.39 rural population growth rate.

On the supply side of education, public spending on education equalizes the education inequality but it is statistically insignificant in the point of statistic view. We also found insignificance of primary schooling enrolment rate on

[4] Sources of data are described in Appendix A.

educational inequality. This is because there is the compulsory schooling attendance law utilizing in most countries in the World.

Last but not least for result of model 1, ratio of capital to GDP equalizes the educational inequality. The requirement of skilled labor will induce the higher demand for schooling of individuals.

Moving on to model 2, we found that there is no significant effect of fertility rate on female education inequality but it is inconsistent in model 3. There is a stronger effect of gender parity on female educational inequality.

Differ from model 2, model 3 use female average years of schooling instead of total average years of schooling, we consistently found the significance equalizing power of education expansion in both variables.

5. CONCLUDING REMARKS

The main objective of this paper has been to investigate macroeconomic factors influencing the schooling inequality across 69 countries during the period of 1975 to 2005 with five-year intervals. Relying on 201 observations, we found that education expansion, ratio of capital to GDP, and ratio of female to male primary enrollment statistically significantly play as powerful equalizer of educational in equality (negative correlations). Past educational inequality, per capita real income, and growth rate of rural population play as significant disequalizer of educational inequality (positive association).

We were unable to find the significant from past income inequality, GDP growth rate, life expectancy and the education expenditure on educational inequality. The impact of inequality in income distribution is no longer persisting over five years. The remaining issue of gender disparity will cause the inequality in education distribution.

In conclusion, there are two major findings. Firstly we found that factors directly involved to schooling like enrolment rate or education expenditures are not significant while the factors indirectly involved to schooling have significant impacts on educational inequality. Secondly, we found quadratic (U-shape) relationship between rural population growth rate and educational inequality. So the higher rural growth rate brings increasing and decreasing of educational inequality with turning point at rate -1.39.

Attachment 3: Estimations of educational inequality: fixed effects, 1975-2005

Gini coefficients of inequality in education	**Total (1)**	**Female (2)**	**Female (3)**
Five-year lagged sch. Gini, total	0.4696***	0.4995***	-
	(0.0521)	(0.0583)	
Five-year lagged sch. Gini, female	-	-	0.4631***
			(0.0556)
Average years of sch., total	-0.0253***	-0.0249***	-0.0251***
	(0.0028)	(0.0032)	(0.0032)
Gross primary school enrollment rate	0.0002	0.00002	0.00003
	(0.0002)	(0.0003)	(0.0003)
Five-year lagged income inequality	0.0131	-0.0164	-0.0075
	(0.0286)	(0.320)	(0.0325)
Total life expectancy at birth	-0.0002	0.0007	-0.0007
	(0.0011)	(0.0012)	(0.0012)
Ratio of female to male primary enrollment	-0.0012[a]	-0.0015*	-0.0016*
	(0.0006)	(0.0007)	(0.0007)
Total fertility rate	-0.0083[a]	-0.0059	-0.0095[a]
	(0.0043)	(0.0049)	(0.0051)
Annual rural population growth	0.0039[a]	0.0045*	0.0045*
	(0.0020)	(0.0022)	(0.0022)
Square of annual rural population growth	0.0014*	0.0018**	0.0017**
	(0.0005)	(0.0006)	(0.0006)
Ratio of public spending on education to GDP	-0.0016	-0.0017	-0.0017
	(0.0015)	(0.0017)	(0.0017)
Ratio of capital to GDP	-0.0012**	-0.0017***	-0.0015**
	(0.0004)	(0.0004)	(0.0004)
GDP Growth rate	0.0003	0.0004	0.0002
	(0.0004)	(0.0005)	(0.0005)
Log of real per capita income	0.0473*	0.0407[a]	0.0600*
	(0.0206)	(0.0230)	(0.0235)
Constant	0.3093**	0.3315**	0.3758**
	(0.0976)	(0.1093)	(0.1088)
No. of Obs./ No. of country	201/69	201/69	201/69
Corr (u_i, Xb)	0.6406	0.6977	0.7019
R^2 overall	0.9567	0.9411	0.9477
R^2 between	0.9567	0.9404	0.9445
R^2 within	0.8630	0.8391	0.8358
F-test	57.68	47.75	46.58
	(0.00)	(0.00)	(0.00)

Note: Standard Errors are reported in the parentheses. The symbols [a], *, **, and *** correspond the significance levels of T statistics differing from zero at 10%, 5%, 1%, and 0.1% respectively. Corresponding population in panel are total and female population age 15 years and over in model 1 and model 2&3 respectively. Dummies of region are automatically omitted from the regressions due to the multicollinearity. Hausman tests are in used to verify the fixed-effects estimator is suitable in analyses instead of random-effects estimator. The null hypotheses are significantly rejected showing the inconsistent random-effects models.

APPENDICES

Appendix A: Data sources

Variable	Source
Educational attainments	Barro and Lee (2011)
Average years of schooling	Barro and Lee (2011)
Gini coefficients of income distribution	Deininger and Squire (1996) and World Institute for Development Economics Research (UNU-WIDER)
Gross primary school enrollment rate	World Development Indicators, World Bank
Total life expectancy at birth	World Development Indicators, World Bank
Ratio of female to male primary enrollment	World Development Indicators, World Bank
Total fertility rate	World Development Indicators, World Bank
Annual rural population growth	World Development Indicators, World Bank
Ratio of public spending on education to GDP	World Development Indicators, World Bank
Ratio of capital to GDP	World Development Indicators, World Bank
GDP Growth rate	World Development Indicators, World Bank
Real per capita income (constant 2000 US$)	World Development Indicators, World Bank

Appendix B: the Gini coefficients of education distribution

Table B-1: Gini coefficients of education distribution: total population age 15 years and over

Country	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	trends
Afghanistan	0.958	0.953	0.946	0.939	0.916	0.893	0.865	0.828	0.805	0.785	0.733	0.695	0.626	⇩
Albania	0.609	0.598	0.407	0.391	0.364	0.319	0.260	0.211	0.163	0.127	0.080	0.061	0.056	⇩
Algeria	0.827	0.833	0.855	0.846	0.789	0.716	0.644	0.561	0.488	0.422	0.366	0.322	0.293	⇩
Argentina	0.210	0.214	0.213	0.205	0.199	0.201	0.199	0.205	0.204	0.189	0.174	0.165	0.164	⇧
Armenia	0.268	0.258	0.234	0.219	0.199	0.176	0.141	0.118	0.101	0.094	0.083	0.079	0.079	⇩
Australia	0.201	0.192	0.182	0.170	0.147	0.117	0.083	0.085	0.082	0.082	0.081	0.079	0.079	⇩
Austria	0.147	0.151	0.193	0.278	0.287	0.262	0.240	0.237	0.228	0.220	0.209	0.194	0.178	⇧
Bahrain	0.887	0.880	0.865	0.815	0.673	0.580	0.505	0.464	0.401	0.279	0.189	0.164	0.145	⇩
Bangladesh	0.820	0.818	0.813	0.815	0.818	0.808	0.718	0.659	0.628	0.589	0.539	0.483	0.428	⇩
Barbados	0.108	0.112	0.117	0.149	0.093	0.130	0.156	0.130	0.106	0.076	0.071	0.048	0.053	⇧
Belgium	0.170	0.171	0.175	0.172	0.177	0.190	0.196	0.198	0.185	0.184	0.180	0.169	0.172	⇧
Belize	0.242	0.238	0.254	0.208	0.164	0.169	0.172	0.204	0.225	0.211	0.200	0.192	0.194	⇧
Benin	0.908	0.904	0.900	0.892	0.884	0.876	0.855	0.815	0.780	0.740	0.706	0.674	0.635	⇩
Bolivia	0.717	0.679	0.640	0.585	0.542	0.490	0.423	0.361	0.302	0.269	0.248	0.198	0.177	⇩
Botswana	0.727	0.723	0.718	0.670	0.610	0.561	0.509	0.447	0.366	0.247	0.195	0.156	0.128	⇩
Brazil	0.705	0.669	0.628	0.580	0.524	0.460	0.475	0.414	0.374	0.340	0.295	0.248	0.233	⇩
Brunei Darussalam	0.738	0.705	0.657	0.607	0.509	0.450	0.392	0.360	0.323	0.307	0.303	0.301	0.294	⇩
Bulgaria	0.234	0.212	0.191	0.163	0.158	0.154	0.153	0.149	0.150	0.147	0.128	0.122	0.120	⇩
Burundi	0.925	0.907	0.885	0.862	0.828	0.799	0.782	0.771	0.746	0.683	0.632	0.602	0.569	⇩
Cambodia	0.263	0.264	0.259	0.244	0.229	0.215	0.201	0.185	0.172	0.160	0.144	0.142	0.142	⇩
Cameroon	0.876	0.849	0.822	0.776	0.723	0.650	0.587	0.523	0.462	0.409	0.375	0.366	0.351	⇩

Country	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	trends
Canada	0.194	0.194	0.190	0.180	0.158	0.143	0.131	0.121	0.112	0.108	0.104	0.097	0.091	⇩
Central African Republic	0.919	0.916	0.909	0.902	0.872	0.833	0.789	0.758	0.703	0.670	0.642	0.622	0.615	⇩
Chile	0.342	0.331	0.312	0.284	0.258	0.247	0.236	0.227	0.222	0.217	0.204	0.185	0.168	⇩
China	0.730	0.684	0.628	0.562	0.480	0.422	0.348	0.321	0.312	0.262	0.219	0.197	0.180	⇩
Colombia	0.496	0.464	0.431	0.406	0.382	0.362	0.348	0.327	0.318	0.312	0.294	0.277	0.249	⇩
Congo	0.866	0.840	0.816	0.767	0.712	0.631	0.569	0.505	0.472	0.432	0.398	0.375	0.354	⇩
Costa Rica	0.281	0.277	0.283	0.284	0.287	0.269	0.246	0.234	0.231	0.230	0.214	0.208	0.187	⇩
Cote Divoire	0.901	0.894	0.887	0.877	0.858	0.828	0.793	0.762	0.727	0.658	0.591	0.555	0.525	⇩
Croatia	0.324	0.316	0.302	0.283	0.264	0.244	0.225	0.206	0.196	0.183	0.174	0.160	0.156	⇩
Cuba	0.317	0.315	0.318	0.314	0.285	0.254	0.186	0.191	0.175	0.162	0.149	0.141	0.136	⇩
Cyprus	0.438	0.394	0.335	0.309	0.304	0.289	0.277	0.229	0.217	0.224	0.218	0.256	0.222	⇩
Czech Republic	0.067	0.071	0.073	0.094	0.097	0.100	0.100	0.121	0.123	0.095	0.079	0.026	0.063	⇧
Demo. Rep. of the Congo	0.865	0.835	0.800	0.771	0.740	0.702	0.661	0.624	0.585	0.564	0.552	0.547	0.561	⇩
Denmark	0.209	0.208	0.207	0.199	0.193	0.196	0.191	0.176	0.170	0.175	0.175	0.175	0.178	⇩
Dominican Rep.	0.452	0.441	0.396	0.439	0.440	0.413	0.381	0.362	0.333	0.305	0.284	0.264	0.247	⇩
Ecuador	0.529	0.477	0.425	0.405	0.389	0.371	0.342	0.338	0.323	0.330	0.342	0.320	0.297	⇩
Egypt	0.944	0.929	0.913	0.888	0.859	0.822	0.733	0.625	0.571	0.515	0.458	0.414	0.374	⇩
El Salvador	0.675	0.653	0.613	0.577	0.529	0.492	0.456	0.435	0.410	0.365	0.315	0.270	0.236	⇩
Estonia	0.213	0.213	0.215	0.214	0.213	0.209	0.204	0.196	0.182	0.146	0.100	0.087	0.080	⇩
Fiji	0.333	0.307	0.283	0.238	0.251	0.227	0.200	0.176	0.153	0.114	0.134	0.150	0.137	⇩
Finland	0.092	0.097	0.109	0.144	0.171	0.199	0.204	0.199	0.190	0.194	0.192	0.180	0.170	⇧
France	0.124	0.134	0.137	0.180	0.175	0.240	0.245	0.281	0.283	0.232	0.181	0.160	0.130	⇧
Gabon	0.909	0.896	0.872	0.825	0.774	0.720	0.664	0.592	0.523	0.437	0.372	0.326	0.281	⇩
Gambia	0.961	0.958	0.954	0.950	0.944	0.926	0.905	0.877	0.821	0.766	0.757	0.715	0.669	⇩
Germany	0.274	0.281	0.286	0.288	0.294	0.314	0.329	0.338	0.320	0.281	0.244	0.117	0.118	⇧

Country	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	trends
Ghana	0.884	0.870	0.814	0.768	0.673	0.606	0.554	0.505	0.472	0.455	0.425	0.392	0.351	⇩
Greece	0.381	0.345	0.254	0.293	0.295	0.278	0.270	0.269	0.261	0.266	0.258	0.208	0.180	⇩
Guatemala	0.725	0.733	0.734	0.732	0.710	0.677	0.569	0.535	0.503	0.476	0.463	0.441	0.368	⇩
Guyana	0.231	0.228	0.225	0.226	0.224	0.226	0.229	0.236	0.239	0.234	0.221	0.205	0.180	⇨
Haiti	0.915	0.900	0.877	0.854	0.825	0.791	0.740	0.581	0.536	0.491	0.473	0.462	0.454	⇩
Honduras	0.667	0.649	0.622	0.593	0.559	0.519	0.449	0.383	0.343	0.303	0.271	0.245	0.218	⇩
Hong Kong	0.523	0.494	0.470	0.415	0.392	0.355	0.315	0.280	0.258	0.275	0.293	0.256	0.224	⇩
Hungary	0.084	0.087	0.090	0.088	0.100	0.112	0.118	0.127	0.133	0.101	0.066	0.059	0.062	⇝
Iceland	0.128	0.140	0.155	0.168	0.180	0.196	0.205	0.209	0.210	0.209	0.209	0.206	0.199	⇝
India	0.776	0.766	0.751	0.749	0.710	0.717	0.711	0.647	0.588	0.549	0.508	0.457	0.415	⇩
Indonesia	0.779	0.746	0.700	0.607	0.509	0.460	0.415	0.497	0.536	0.450	0.361	0.338	0.323	⇩
Iran	0.932	0.921	0.893	0.840	0.788	0.737	0.673	0.598	0.550	0.427	0.351	0.300	0.271	⇩
Iraq	0.979	0.966	0.946	0.915	0.851	0.805	0.743	0.655	0.571	0.516	0.476	0.464	0.437	⇩
Ireland	0.163	0.163	0.162	0.158	0.159	0.158	0.144	0.140	0.146	0.164	0.162	0.144	0.131	⇘
Israel	0.347	0.341	0.328	0.312	0.287	0.257	0.223	0.213	0.205	0.196	0.186	0.175	0.162	⇩
Italy	0.258	0.258	0.253	0.237	0.228	0.253	0.254	0.252	0.241	0.224	0.204	0.191	0.171	⇘
Jamaica	0.215	0.212	0.222	0.191	0.140	0.155	0.174	0.198	0.200	0.204	0.189	0.167	0.160	⇘
Japan	0.210	0.204	0.190	0.185	0.183	0.183	0.174	0.171	0.170	0.155	0.148	0.140	0.131	⇩
Jordan	0.846	0.800	0.730	0.683	0.651	0.608	0.558	0.502	0.430	0.373	0.333	0.297	0.269	⇩
Kazakhstan	0.535	0.501	0.481	0.456	0.423	0.379	0.324	0.284	0.244	0.173	0.092	0.091	0.096	⇩
Kenya	0.798	0.774	0.740	0.722	0.679	0.610	0.524	0.431	0.354	0.305	0.273	0.240	0.210	⇩
Korea	0.344	0.319	0.517	0.426	0.366	0.300	0.252	0.221	0.238	0.168	0.158	0.144	0.129	⇩
Kuwait	0.771	0.734	0.689	0.641	0.608	0.666	0.584	0.524	0.486	0.464	0.407	0.317	0.293	⇩
Kyrgyzstan	0.429	0.417	0.406	0.391	0.371	0.335	0.286	0.253	0.219	0.195	0.163	0.180	0.179	⇩
Lao PDR	0.763	0.745	0.722	0.699	0.664	0.625	0.587	0.559	0.526	0.495	0.466	0.440	0.414	⇩

Country	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	trends
Latvia	0.264	0.273	0.279	0.281	0.279	0.271	0.241	0.213	0.185	0.137	0.116	0.074	0.075	
Lesotho	0.468	0.424	0.380	0.331	0.325	0.329	0.314	0.304	0.297	0.287	0.274	0.242	0.213	
Liberia	0.929	0.924	0.907	0.890	0.875	0.825	0.771	0.715	0.671	0.660	0.633	0.585	0.507	
Libyan Arab Jamahiriya	0.872	0.858	0.843	0.791	0.717	0.643	0.588	0.536	0.476	0.438	0.410	0.386	0.365	
Lithuania	0.501	0.474	0.438	0.410	0.373	0.332	0.275	0.225	0.181	0.163	0.134	0.115	0.098	
Luxembourg	0.199	0.200	0.207	0.205	0.197	0.203	0.209	0.215	0.215	0.218	0.211	0.200	0.188	
Macao	0.380	0.374	0.363	0.334	0.300	0.281	0.275	0.252	0.241	0.234	0.211	0.186	0.178	
Malawi	0.662	0.648	0.636	0.623	0.538	0.530	0.539	0.530	0.490	0.466	0.412	0.314	0.265	
Malaysia	0.660	0.628	0.579	0.532	0.472	0.440	0.404	0.347	0.306	0.259	0.233	0.202	0.181	
Maldives	0.624	0.609	0.596	0.575	0.553	0.525	0.498	0.467	0.478	0.488	0.455	0.393	0.316	
Mali	0.963	0.959	0.956	0.951	0.942	0.915	0.893	0.870	0.853	0.842	0.822	0.777	0.706	
Malta	0.610	0.538	0.461	0.407	0.393	0.379	0.273	0.255	0.233	0.255	0.221	0.170	0.165	
Mauritania	0.673	0.670	0.669	0.665	0.663	0.662	0.662	0.648	0.623	0.590	0.548	0.480	0.411	
Mauritius	0.574	0.549	0.512	0.454	0.399	0.387	0.385	0.354	0.320	0.277	0.256	0.232	0.216	
Mexico	0.515	0.493	0.472	0.451	0.421	0.429	0.413	0.361	0.314	0.284	0.261	0.230	0.198	
Moldova	0.611	0.571	0.527	0.484	0.421	0.357	0.302	0.254	0.210	0.170	0.141	0.119	0.100	
Mongolia	0.746	0.707	0.641	0.579	0.569	0.344	0.281	0.227	0.168	0.178	0.178	0.174	0.156	
Morocco	0.971	0.968	0.949	0.928	0.896	0.856	0.818	0.775	0.726	0.683	0.645	0.603	0.555	
Mozambique	0.860	0.818	0.777	0.737	0.742	0.764	0.731	0.732	0.784	0.808	0.795	0.774	0.717	
Myanmar	0.840	0.826	0.814	0.782	0.779	0.757	0.671	0.600	0.494	0.440	0.402	0.384	0.360	
Namibia	0.698	0.659	0.615	0.561	0.504	0.458	0.425	0.387	0.347	0.335	0.346	0.332	0.330	
Nepal	0.988	0.988	0.985	0.967	0.937	0.910	0.877	0.795	0.713	0.685	0.616	0.541	0.473	
Netherlands	0.084	0.090	0.094	0.162	0.151	0.154	0.148	0.146	0.141	0.137	0.133	0.129	0.119	
New Zealand	0.145	0.137	0.131	0.120	0.117	0.100	0.129	0.137	0.150	0.150	0.147	0.144	0.142	
Nicaragua	0.672	0.646	0.610	0.594	0.587	0.574	0.567	0.550	0.524	0.499	0.462	0.417	0.371	

Country	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	trends
Niger	0.927	0.925	0.925	0.925	0.919	0.914	0.904	0.887	0.865	0.842	0.825	0.809	0.777	⇩
Norway	0.110	0.104	0.099	0.128	0.139	0.163	0.171	0.159	0.142	0.132	0.122	0.049	0.058	⩛
Pakistan	0.882	0.879	0.863	0.847	0.838	0.810	0.789	0.756	0.720	0.702	0.673	0.545	0.491	⩛
Panama	0.421	0.388	0.349	0.351	0.352	0.329	0.299	0.275	0.257	0.249	0.239	0.221	0.208	⇩
Papua New Guinea	0.923	0.908	0.880	0.848	0.801	0.772	0.733	0.680	0.627	0.577	0.522	0.472	0.453	⇩
Paraguay	0.425	0.370	0.312	0.306	0.282	0.267	0.262	0.254	0.254	0.244	0.258	0.204	0.185	⇩
Peru	0.507	0.487	0.467	0.447	0.408	0.369	0.327	0.312	0.309	0.288	0.248	0.216	0.186	⇩
Philippines	0.543	0.386	0.379	0.346	0.303	0.258	0.248	0.232	0.214	0.215	0.215	0.201	0.187	⇩
Poland	0.190	0.179	0.169	0.157	0.143	0.137	0.122	0.117	0.114	0.115	0.109	0.103	0.101	⇩
Portugal	0.515	0.484	0.450	0.467	0.459	0.411	0.355	0.324	0.297	0.307	0.302	0.292	0.265	⇩
Qatar	0.836	0.796	0.768	0.715	0.679	0.635	0.594	0.557	0.528	0.482	0.451	0.410	0.378	⇩
Reunion	0.629	0.693	0.573	0.478	0.434	0.379	0.337	0.304	0.273	0.245	0.219	0.196	0.173	⇩
Romania	0.235	0.229	0.216	0.195	0.177	0.175	0.151	0.129	0.114	0.107	0.092	0.085	0.087	⇩
Russian Federation	0.351	0.330	0.316	0.290	0.259	0.247	0.222	0.202	0.178	0.144	0.105	0.099	0.093	⇩
Rwanda	0.952	0.924	0.853	0.820	0.786	0.735	0.694	0.668	0.645	0.616	0.586	0.567	0.529	⇩
Saudi Arabia	0.670	0.665	0.659	0.651	0.642	0.597	0.551	0.477	0.415	0.403	0.351	0.299	0.247	⇩
Senegal	0.619	0.619	0.614	0.610	0.595	0.577	0.561	0.542	0.516	0.483	0.443	0.408	0.372	⇩
Serbia	0.386	0.357	0.330	0.295	0.265	0.254	0.234	0.215	0.209	0.192	0.182	0.175	0.169	⇩
Sierra Leone	0.959	0.955	0.951	0.938	0.918	0.892	0.863	0.832	0.796	0.751	0.726	0.704	0.674	⇩
Singapore	0.679	0.638	0.582	0.527	0.448	0.442	0.424	0.338	0.255	0.259	0.256	0.255	0.230	⇩
Slovakia	0.077	0.077	0.074	0.091	0.091	0.096	0.092	0.105	0.104	0.098	0.099	0.096	0.096	⌒
Slovenia	0.321	0.296	0.271	0.227	0.193	0.179	0.164	0.119	0.077	0.072	0.059	0.058	0.061	⇩
South Africa	0.543	0.529	0.522	0.488	0.455	0.408	0.363	0.287	0.226	0.175	0.236	0.192	0.162	⇩
Spain	0.614	0.592	0.567	0.538	0.453	0.473	0.430	0.414	0.393	0.294	0.227	0.200	0.167	⇩
Sri Lanka	0.409	0.384	0.365	0.342	0.255	0.237	0.216	0.216	0.196	0.184	0.167	0.157	0.150	⇩

Country	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	trends
Sudan	0.923	0.909	0.897	0.876	0.852	0.826	0.783	0.742	0.703	0.671	0.642	0.626	0.616	
Swaziland	0.805	0.766	0.727	0.669	0.581	0.496	0.459	0.419	0.358	0.314	0.262	0.222	0.202	
Sweden	0.197	0.201	0.202	0.200	0.195	0.200	0.185	0.178	0.167	0.131	0.135	0.106	0.102	
Switzerland	0.213	0.216	0.218	0.235	0.240	0.212	0.175	0.228	0.256	0.275	0.276	0.271	0.259	
Syrian Arab Republic	0.761	0.749	0.726	0.701	0.646	0.592	0.517	0.441	0.381	0.316	0.297	0.264	0.249	
Taiwan	0.512	0.474	0.444	0.402	0.367	0.333	0.297	0.262	0.233	0.201	0.172	0.147	0.130	
Tajikistan	0.560	0.522	0.480	0.440	0.379	0.311	0.246	0.192	0.147	0.105	0.096	0.104	0.103	
Tanzania	0.710	0.703	0.674	0.648	0.606	0.575	0.505	0.450	0.405	0.373	0.340	0.288	0.225	
Thailand	0.530	0.467	0.412	0.350	0.311	0.286	0.261	0.268	0.251	0.262	0.278	0.286	0.285	
Togo	0.927	0.916	0.898	0.881	0.844	0.783	0.706	0.636	0.570	0.534	0.498	0.470	0.445	
Tonga	0.322	0.311	0.296	0.276	0.249	0.207	0.186	0.180	0.132	0.097	0.113	0.132	0.130	
Trinidad and Tobago	0.212	0.206	0.194	0.186	0.181	0.151	0.131	0.147	0.153	0.137	0.120	0.108	0.101	
Tunisia	0.924	0.907	0.890	0.850	0.796	0.712	0.624	0.606	0.552	0.492	0.438	0.396	0.360	
Turkey	0.827	0.780	0.717	0.662	0.623	0.565	0.520	0.473	0.439	0.403	0.329	0.294	0.280	
Uganda	0.818	0.796	0.771	0.717	0.643	0.580	0.555	0.504	0.440	0.381	0.347	0.293	0.248	
Ukraine	0.375	0.365	0.348	0.323	0.303	0.258	0.224	0.194	0.167	0.144	0.134	0.112	0.110	
United Arab Emirates	0.925	0.896	0.864	0.816	0.780	0.739	0.665	0.584	0.488	0.378	0.293	0.234	0.220	
United Kingdom	0.142	0.146	0.146	0.165	0.179	0.181	0.183	0.179	0.181	0.183	0.183	0.178	0.173	
Uruguay	0.287	0.277	0.267	0.257	0.251	0.247	0.228	0.213	0.217	0.220	0.191	0.179	0.164	
USA	0.201	0.194	0.185	0.149	0.122	0.100	0.083	0.099	0.106	0.078	0.076	0.073	0.071	
Venezuela	0.542	0.509	0.472	0.471	0.443	0.383	0.320	0.329	0.337	0.322	0.311	0.302	0.282	
Viet Nam	0.564	0.564	0.522	0.481	0.434	0.385	0.336	0.313	0.251	0.243	0.243	0.248	0.248	
Yemen	0.997	0.996	0.994	0.991	0.989	0.990	0.964	0.927	0.874	0.820	0.757	0.701	0.633	
Zambia	0.600	0.565	0.520	0.472	0.427	0.430	0.427	0.417	0.415	0.282	0.282	0.271	0.242	
Zimbabwe	0.566	0.536	0.499	0.467	0.417	0.403	0.420	0.396	0.328	0.254	0.202	0.177	0.154	

Source: Authors' calculations by utilizing educational attainment data based on Barro and Lee (2011). The calculations cover 146 countries from 1950 to 2010, five-year intervals period. The arrows present the trend of each country's educational inequality over time.

Table B-2: Gini coefficients of education distribution: female population age 15 years and over

COUNTRY	Gini Index of Education Distribution, Female Population aged 15 and over, by five-year intervals													
	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	Trend
Afghanistan	0.990	0.989	0.988	0.987	0.980	0.971	0.959	0.944	0.929	0.913	0.881	0.870	0.833	⇩
Albania	0.683	0.674	0.439	0.417	0.393	0.344	0.286	0.234	0.179	0.138	0.086	0.067	0.063	⇩
Algeria	0.854	0.861	0.892	0.914	0.899	0.840	0.779	0.706	0.636	0.568	0.503	0.444	0.392	⌒
Argentina	0.221	0.221	0.216	0.208	0.204	0.207	0.203	0.214	0.212	0.198	0.180	0.170	0.166	⇩
Armenia	0.275	0.263	0.243	0.227	0.203	0.178	0.144	0.123	0.107	0.098	0.086	0.088	0.091	⇩
Australia	0.195	0.186	0.176	0.163	0.130	0.102	0.077	0.081	0.083	0.088	0.088	0.087	0.086	⇩
Austria	0.089	0.095	0.136	0.229	0.267	0.260	0.249	0.254	0.252	0.249	0.241	0.226	0.213	⌒
Bahrain	0.953	0.944	0.917	0.847	0.757	0.642	0.563	0.509	0.428	0.326	0.256	0.201	0.170	⇩
Bangladesh	0.930	0.926	0.915	0.915	0.912	0.905	0.824	0.751	0.704	0.646	0.577	0.518	0.458	⇩
Barbados	0.108	0.110	0.116	0.151	0.100	0.132	0.153	0.132	0.110	0.079	0.070	0.051	0.059	⩘
Belgium	0.157	0.161	0.163	0.161	0.168	0.184	0.192	0.197	0.187	0.186	0.184	0.175	0.179	⌒
Belize	0.234	0.231	0.248	0.201	0.163	0.166	0.167	0.202	0.226	0.209	0.199	0.193	0.195	⩘
Benin	0.955	0.953	0.951	0.946	0.941	0.933	0.915	0.885	0.851	0.821	0.795	0.765	0.720	⇩
Bolivia	0.785	0.757	0.733	0.686	0.642	0.588	0.511	0.439	0.368	0.326	0.300	0.241	0.214	⇩
Botswana	0.695	0.690	0.689	0.641	0.581	0.529	0.469	0.420	0.341	0.239	0.193	0.162	0.137	⇩
Brazil	0.725	0.687	0.645	0.593	0.541	0.470	0.484	0.409	0.359	0.320	0.290	0.249	0.233	⇩
Brunei	0.897	0.869	0.832	0.775	0.633	0.565	0.453	0.412	0.362	0.323	0.306	0.300	0.288	⇩

COUNTRY	Gini Index of Education Distribution, Female Population aged 15 and over, by five-year intervals													
	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	Trend
Bulgaria	0.307	0.276	0.240	0.201	0.187	0.168	0.165	0.162	0.162	0.156	0.134	0.128	0.124	⇩
Burundi	0.968	0.963	0.935	0.910	0.896	0.885	0.863	0.844	0.826	0.754	0.701	0.666	0.630	⇩
Cambodia	0.266	0.262	0.251	0.237	0.221	0.206	0.190	0.173	0.158	0.144	0.120	0.127	0.130	⇩
Cameroon	0.955	0.941	0.923	0.883	0.833	0.753	0.679	0.604	0.532	0.467	0.426	0.408	0.390	⇩
Canada	0.186	0.186	0.182	0.171	0.149	0.136	0.124	0.117	0.109	0.108	0.104	0.097	0.093	⇩
Central African Republic	0.939	0.940	0.939	0.938	0.929	0.906	0.872	0.847	0.799	0.769	0.741	0.719	0.709	⇩
Chile	0.350	0.336	0.316	0.284	0.256	0.247	0.240	0.231	0.225	0.219	0.207	0.189	0.173	⇩
China	0.817	0.765	0.702	0.618	0.521	0.455	0.386	0.338	0.307	0.289	0.272	0.244	0.220	⇩
Colombia	0.513	0.475	0.431	0.398	0.379	0.361	0.335	0.319	0.311	0.305	0.287	0.272	0.242	⇩
Congo	0.948	0.945	0.939	0.900	0.843	0.739	0.667	0.596	0.531	0.490	0.475	0.474	0.472	⇩
Costa Rica	0.284	0.279	0.280	0.280	0.283	0.265	0.243	0.235	0.231	0.230	0.214	0.209	0.185	⇘
Cote Divoire	0.946	0.944	0.941	0.937	0.924	0.907	0.881	0.851	0.819	0.740	0.669	0.638	0.612	⇩
Croatia	0.359	0.352	0.335	0.316	0.297	0.276	0.257	0.238	0.227	0.211	0.203	0.190	0.185	⇩
Cuba	0.298	0.286	0.274	0.258	0.245	0.240	0.194	0.202	0.189	0.177	0.164	0.153	0.149	⇩
Cyprus	0.570	0.494	0.413	0.376	0.356	0.332	0.314	0.257	0.243	0.255	0.248	0.316	0.273	⇩
Czech Republic	0.047	0.052	0.057	0.075	0.083	0.094	0.096	0.100	0.094	0.081	0.073	0.023	0.062	↷
DR Congo	0.972	0.960	0.939	0.917	0.879	0.826	0.778	0.728	0.680	0.655	0.641	0.634	0.641	⇩
Denmark	0.190	0.191	0.193	0.188	0.183	0.187	0.187	0.175	0.174	0.179	0.179	0.179	0.181	↘
Dominican Rep.	0.407	0.413	0.397	0.448	0.461	0.450	0.436	0.418	0.386	0.357	0.332	0.303	0.277	⇘
Ecuador	0.575	0.519	0.460	0.439	0.421	0.400	0.361	0.356	0.340	0.340	0.350	0.326	0.305	⇩
Egypt	0.978	0.967	0.957	0.938	0.914	0.886	0.825	0.739	0.683	0.615	0.544	0.488	0.440	⇩
El Salvador	0.698	0.681	0.645	0.612	0.563	0.527	0.483	0.447	0.416	0.380	0.336	0.292	0.257	⇩
Estonia	0.209	0.210	0.219	0.221	0.221	0.217	0.212	0.203	0.187	0.150	0.106	0.090	0.084	↷

COUNTRY	Gini Index of Education Distribution, Female Population aged 15 and over, by five-year intervals													
	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	Trend
Fiji	0.430	0.395	0.358	0.295	0.303	0.269	0.233	0.196	0.168	0.130	0.144	0.156	0.141	
Finland	0.098	0.092	0.091	0.134	0.156	0.190	0.201	0.195	0.186	0.196	0.191	0.182	0.173	
France	0.116	0.125	0.122	0.163	0.168	0.229	0.239	0.283	0.289	0.241	0.191	0.171	0.139	
Gabon	0.812	0.796	0.768	0.729	0.686	0.623	0.563	0.504	0.451	0.397	0.354	0.324	0.298	
Gambia	0.971	0.972	0.971	0.970	0.966	0.957	0.943	0.925	0.882	0.833	0.823	0.780	0.725	
Germany	0.248	0.254	0.260	0.264	0.266	0.295	0.312	0.324	0.320	0.297	0.269	0.115	0.116	
Ghana	0.946	0.938	0.902	0.864	0.781	0.715	0.678	0.636	0.598	0.566	0.522	0.476	0.414	
Greece	0.464	0.429	0.339	0.354	0.349	0.327	0.310	0.302	0.290	0.296	0.289	0.226	0.195	
Guatemala	0.781	0.786	0.786	0.777	0.749	0.715	0.628	0.597	0.560	0.528	0.510	0.485	0.416	
Guyana	0.299	0.288	0.265	0.242	0.235	0.235	0.240	0.255	0.253	0.236	0.207	0.188	0.163	
Haiti	0.929	0.918	0.903	0.887	0.863	0.821	0.766	0.730	0.691	0.651	0.633	0.621	0.616	
Honduras	0.698	0.680	0.650	0.618	0.582	0.531	0.454	0.383	0.347	0.313	0.282	0.255	0.228	
Hong Kong	0.684	0.647	0.616	0.541	0.502	0.449	0.393	0.342	0.308	0.312	0.321	0.277	0.246	
Hungary	0.073	0.075	0.079	0.079	0.092	0.103	0.111	0.123	0.131	0.107	0.071	0.062	0.066	
Iceland	0.106	0.126	0.142	0.156	0.170	0.182	0.192	0.199	0.203	0.201	0.196	0.192	0.189	
India	0.905	0.895	0.879	0.863	0.835	0.839	0.822	0.771	0.715	0.675	0.632	0.577	0.529	
Indonesia	0.866	0.842	0.804	0.720	0.613	0.547	0.488	0.563	0.582	0.478	0.369	0.341	0.320	
Iran	0.967	0.960	0.940	0.904	0.865	0.817	0.756	0.684	0.637	0.530	0.457	0.412	0.365	
Iraq	0.992	0.986	0.977	0.961	0.921	0.891	0.848	0.771	0.672	0.605	0.555	0.536	0.507	
Ireland	0.167	0.164	0.161	0.155	0.151	0.149	0.140	0.138	0.143	0.157	0.161	0.143	0.132	
Israel	0.397	0.391	0.376	0.354	0.320	0.287	0.251	0.232	0.215	0.203	0.191	0.182	0.166	
Italy	0.262	0.260	0.255	0.238	0.229	0.261	0.270	0.272	0.266	0.251	0.234	0.226	0.203	
Jamaica	0.203	0.195	0.197	0.175	0.138	0.161	0.174	0.198	0.198	0.200	0.186	0.171	0.167	

COUNTRY	Gini Index of Education Distribution, Female Population aged 15 and over, by five-year intervals													
	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	Trend
Japan	0.211	0.199	0.186	0.166	0.166	0.168	0.166	0.165	0.167	0.154	0.149	0.142	0.134	⇩
Jordan	0.928	0.906	0.860	0.819	0.774	0.718	0.655	0.575	0.502	0.435	0.389	0.339	0.300	⇩
Kazakhstan	0.567	0.531	0.521	0.492	0.454	0.404	0.355	0.310	0.265	0.190	0.107	0.103	0.104	⇩
Kenya	0.887	0.871	0.845	0.826	0.776	0.712	0.623	0.508	0.411	0.340	0.297	0.260	0.224	⇩
Kuwait	0.906	0.875	0.821	0.758	0.694	0.693	0.586	0.500	0.474	0.470	0.413	0.322	0.286	⇩
Kyrgyzstan	0.435	0.424	0.426	0.412	0.386	0.349	0.309	0.273	0.239	0.209	0.171	0.183	0.176	⇩
Lao PDR	0.902	0.891	0.874	0.853	0.817	0.773	0.724	0.682	0.638	0.596	0.556	0.517	0.483	⇩
Latvia	0.253	0.262	0.273	0.278	0.278	0.273	0.247	0.221	0.194	0.145	0.118	0.080	0.078	⌒
Lesotho	0.405	0.350	0.302	0.246	0.227	0.220	0.206	0.200	0.197	0.197	0.200	0.184	0.170	⇩
Liberia	0.968	0.966	0.958	0.948	0.936	0.911	0.882	0.842	0.806	0.798	0.782	0.742	0.662	⇩
Libyan Arab Jamahiriya	0.993	0.989	0.982	0.957	0.922	0.852	0.774	0.682	0.593	0.506	0.435	0.379	0.338	⇩
Lithuania	0.531	0.504	0.467	0.442	0.405	0.366	0.309	0.258	0.214	0.188	0.150	0.128	0.107	⇩
Luxembourg	0.168	0.173	0.182	0.183	0.180	0.192	0.202	0.210	0.215	0.219	0.217	0.212	0.202	⌒
Macao	0.436	0.432	0.416	0.386	0.341	0.329	0.326	0.293	0.273	0.261	0.233	0.207	0.194	⇩
Malawi	0.768	0.754	0.743	0.731	0.658	0.639	0.662	0.654	0.594	0.555	0.486	0.378	0.312	⇘
Malaysia	0.853	0.815	0.753	0.690	0.601	0.538	0.473	0.400	0.347	0.295	0.265	0.227	0.200	⇩
Maldives	0.653	0.641	0.627	0.602	0.579	0.551	0.521	0.480	0.497	0.505	0.463	0.415	0.327	⇘
Mali	0.978	0.975	0.974	0.970	0.967	0.948	0.927	0.907	0.890	0.878	0.858	0.817	0.751	⇩
Malta	0.622	0.534	0.453	0.391	0.389	0.384	0.274	0.261	0.243	0.273	0.241	0.178	0.189	⇩
Mauritania	0.703	0.699	0.697	0.697	0.697	0.695	0.689	0.683	0.670	0.655	0.628	0.574	0.505	⇩
Mauritius	0.672	0.637	0.593	0.530	0.472	0.451	0.432	0.402	0.364	0.314	0.289	0.258	0.238	⇩
Mexico	0.550	0.525	0.496	0.499	0.481	0.453	0.422	0.375	0.329	0.297	0.272	0.244	0.212	⇩
Mongolia	0.757	0.720	0.650	0.591	0.577	0.363	0.301	0.248	0.179	0.190	0.179	0.167	0.143	⇩

COUNTRY	Gini Index of Education Distribution, Female Population aged 15 and over, by five-year intervals													
	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	Trend
Morocco	0.977	0.974	0.964	0.956	0.938	0.913	0.881	0.846	0.805	0.768	0.733	0.690	0.640	⇩
Mozambique	0.902	0.896	0.890	0.883	0.885	0.896	0.871	0.850	0.869	0.874	0.860	0.847	0.799	⩘
Myanmar	0.850	0.838	0.836	0.825	0.810	0.788	0.701	0.629	0.495	0.448	0.411	0.386	0.358	⇩
Namibia	0.743	0.706	0.661	0.602	0.543	0.492	0.454	0.410	0.362	0.342	0.345	0.313	0.308	⇩
Nepal	0.998	0.997	0.996	0.993	0.986	0.979	0.971	0.915	0.850	0.818	0.746	0.670	0.594	⇩
Netherlands	0.068	0.071	0.079	0.151	0.151	0.159	0.155	0.151	0.146	0.140	0.136	0.133	0.123	⌒
New Zealand	0.139	0.133	0.125	0.115	0.117	0.103	0.132	0.141	0.154	0.154	0.152	0.149	0.147	∪
Nicaragua	0.660	0.661	0.662	0.666	0.674	0.675	0.666	0.644	0.611	0.581	0.540	0.492	0.442	⇩
Niger	0.989	0.989	0.989	0.989	0.984	0.976	0.965	0.948	0.927	0.910	0.897	0.884	0.855	⇩
Norway	0.086	0.084	0.084	0.104	0.122	0.148	0.160	0.158	0.145	0.139	0.128	0.051	0.058	⌒
Pakistan	0.952	0.952	0.944	0.935	0.919	0.900	0.909	0.865	0.842	0.813	0.785	0.667	0.609	⇩
Panama	0.426	0.389	0.346	0.333	0.320	0.314	0.304	0.281	0.262	0.254	0.242	0.222	0.205	⇩
Papua New Guinea	0.954	0.946	0.913	0.868	0.838	0.825	0.786	0.758	0.708	0.654	0.598	0.546	0.522	⇩
Paraguay	0.500	0.426	0.351	0.341	0.316	0.296	0.284	0.273	0.267	0.255	0.272	0.218	0.197	⇩
Peru	0.617	0.598	0.576	0.545	0.492	0.445	0.398	0.371	0.358	0.335	0.298	0.267	0.234	⇩
Philippines	0.580	0.423	0.400	0.370	0.324	0.270	0.260	0.246	0.218	0.219	0.215	0.194	0.176	⇩
Poland	0.215	0.194	0.178	0.164	0.152	0.143	0.129	0.125	0.113	0.127	0.122	0.115	0.110	⇩
Portugal	0.551	0.527	0.494	0.525	0.514	0.455	0.382	0.357	0.326	0.338	0.339	0.329	0.297	⇩
Qatar	0.842	0.777	0.784	0.775	0.710	0.649	0.577	0.525	0.486	0.444	0.408	0.373	0.326	⇩
Réunion	0.609	0.677	0.548	0.454	0.432	0.403	0.373	0.345	0.306	0.275	0.249	0.227	0.203	⇩
Republic of Korea	0.415	0.381	0.602	0.490	0.420	0.344	0.296	0.267	0.297	0.209	0.200	0.185	0.169	⇩
Republic of Moldova	0.661	0.621	0.573	0.531	0.463	0.401	0.344	0.294	0.247	0.205	0.174	0.151	0.129	⇩
Romania	0.274	0.265	0.246	0.224	0.208	0.223	0.195	0.163	0.139	0.127	0.105	0.098	0.096	⇩

COUNTRY	Gini Index of Education Distribution, Female Population aged 15 and over, by five-year intervals													
	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	Trend
Russian Federation	0.352	0.343	0.328	0.311	0.284	0.267	0.241	0.219	0.194	0.167	0.112	0.104	0.099	⇩
Rwanda	0.977	0.974	0.950	0.932	0.894	0.842	0.792	0.755	0.714	0.668	0.619	0.588	0.543	⇩
Saudi Arabia	0.746	0.744	0.744	0.746	0.748	0.725	0.703	0.635	0.569	0.505	0.434	0.353	0.290	⇩
Senegal	0.743	0.740	0.736	0.729	0.715	0.698	0.678	0.660	0.636	0.606	0.568	0.528	0.483	⇩
Serbia	0.460	0.434	0.399	0.357	0.324	0.304	0.279	0.256	0.245	0.223	0.206	0.194	0.184	⇩
Sierra Leone	0.970	0.971	0.970	0.964	0.951	0.933	0.910	0.885	0.847	0.815	0.795	0.776	0.748	⇩
Singapore	0.835	0.795	0.728	0.659	0.557	0.521	0.484	0.394	0.300	0.300	0.295	0.296	0.262	⇩
Slovakia	0.060	0.059	0.059	0.076	0.081	0.093	0.093	0.108	0.109	0.109	0.106	0.098	0.095	⇘⇗
Slovenia	0.362	0.338	0.313	0.262	0.226	0.208	0.189	0.134	0.078	0.074	0.063	0.063	0.066	⇩
South Africa	0.556	0.537	0.520	0.493	0.461	0.407	0.354	0.301	0.230	0.167	0.252	0.201	0.169	⇩
Spain	0.639	0.616	0.591	0.561	0.467	0.498	0.453	0.441	0.418	0.313	0.241	0.214	0.179	⇩
Sri Lanka	0.563	0.520	0.485	0.443	0.334	0.296	0.263	0.252	0.222	0.206	0.183	0.171	0.160	⇩
Sudan	0.987	0.981	0.969	0.953	0.931	0.903	0.877	0.835	0.795	0.760	0.728	0.707	0.691	⇩
Swaziland	0.813	0.776	0.740	0.677	0.597	0.514	0.455	0.402	0.347	0.301	0.256	0.226	0.213	⇩
Sweden	0.191	0.195	0.198	0.196	0.190	0.198	0.185	0.176	0.163	0.116	0.131	0.102	0.103	⇗
Switzerland	0.188	0.194	0.198	0.223	0.232	0.212	0.183	0.230	0.258	0.276	0.289	0.273	0.263	⇗
Syrian Arab Republic	0.913	0.905	0.885	0.864	0.821	0.773	0.683	0.591	0.509	0.392	0.352	0.321	0.294	⇩
Taiwan	0.659	0.607	0.568	0.512	0.457	0.408	0.351	0.302	0.266	0.229	0.206	0.177	0.161	⇩
Tajikistan	0.596	0.562	0.530	0.491	0.425	0.357	0.281	0.224	0.176	0.123	0.082	0.060	0.043	⇩
Thailand	0.622	0.550	0.488	0.416	0.370	0.329	0.291	0.289	0.267	0.276	0.294	0.296	0.292	⇩
Togo	0.979	0.974	0.965	0.952	0.926	0.879	0.823	0.766	0.700	0.656	0.612	0.576	0.539	⇩
Tonga	0.325	0.324	0.313	0.286	0.259	0.219	0.195	0.188	0.141	0.098	0.109	0.131	0.136	⇩
Trinidad and Tobago	0.263	0.254	0.234	0.218	0.200	0.158	0.128	0.149	0.159	0.142	0.123	0.112	0.111	⇩

COUNTRY	Gini Index of Education Distribution, Female Population aged 15 and over, by five-year intervals													
	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	Trend
Tunisia	0.964	0.957	0.947	0.916	0.873	0.797	0.732	0.709	0.647	0.578	0.522	0.475	0.432	⇩
Turkey	0.900	0.874	0.832	0.801	0.768	0.679	0.629	0.556	0.512	0.476	0.399	0.357	0.343	⇩
Uganda	0.906	0.890	0.868	0.845	0.783	0.713	0.669	0.611	0.533	0.461	0.409	0.342	0.281	⇩
Ukraine	0.396	0.388	0.373	0.351	0.337	0.296	0.265	0.232	0.199	0.168	0.158	0.131	0.124	⇩
United Arab Emirates	0.968	0.947	0.922	0.874	0.831	0.771	0.664	0.566	0.468	0.351	0.268	0.198	0.184	⇩
United Kingdom	0.145	0.145	0.144	0.159	0.168	0.169	0.166	0.165	0.168	0.172	0.174	0.168	0.164	⇘⇙
United Republic of Tanzania	0.846	0.843	0.820	0.799	0.758	0.721	0.652	0.563	0.492	0.455	0.402	0.350	0.275	⇩
Uruguay	0.291	0.280	0.269	0.257	0.253	0.253	0.230	0.210	0.206	0.200	0.184	0.186	0.166	⇩
USA	0.193	0.184	0.174	0.140	0.113	0.093	0.080	0.079	0.078	0.075	0.075	0.072	0.069	⇩
Venezuela	0.579	0.559	0.529	0.503	0.476	0.405	0.331	0.342	0.343	0.334	0.330	0.324	0.305	⇩
Viet Nam	0.641	0.643	0.596	0.549	0.498	0.445	0.392	0.351	0.279	0.269	0.267	0.265	0.260	⇩
Yemen	0.997	0.997	0.997	0.997	0.996	0.997	0.987	0.977	0.958	0.923	0.886	0.838	0.768	⇩
Zambia	0.694	0.658	0.610	0.556	0.490	0.525	0.532	0.517	0.509	0.273	0.329	0.314	0.282	⇩
Zimbabwe	0.633	0.602	0.561	0.525	0.464	0.444	0.445	0.432	0.364	0.291	0.231	0.200	0.173	⇩

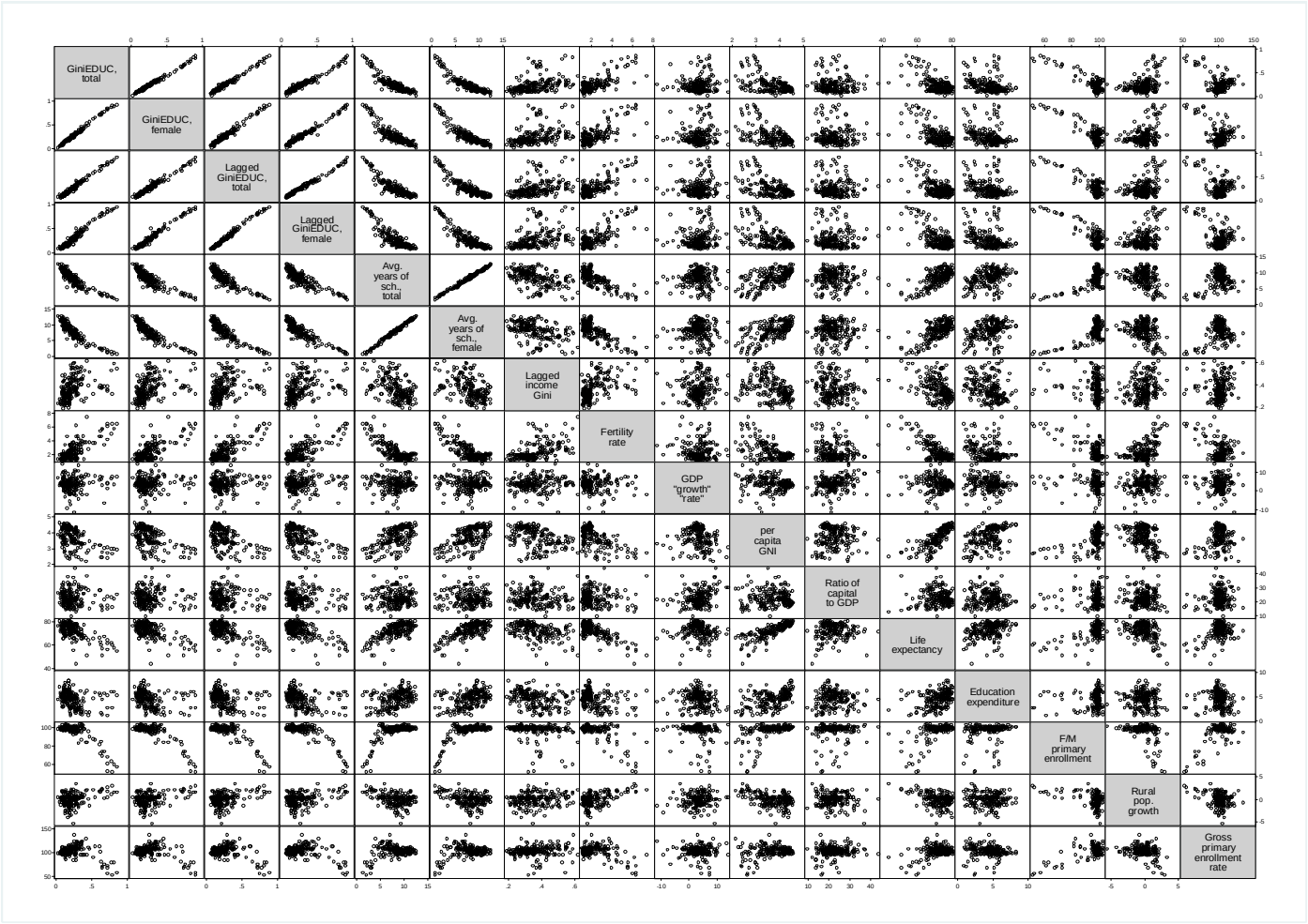
Sources: Authors' calculation by utilizing educational attainments data from Barro and Lee (2011). The calculation covers 146 countries from 1950 to 2010, five-year intervals period. The arrows present the trend of educational inequality over time of each country.

Appendix C: Descriptive statistics of variables

variable	Mean	Std. Dev.	Min	Max
Education Gini, total	0.2360	0.1561	0.0259	0.8564
Education Gini, female	0.2541	0.1801	0.0230	0.9126
Lagged Education Gini, total	0.2548	0.1687	0.0585	0.8959
Lagged Education Gini, female	0.2734	0.1937	0.0631	0.9379
Avg. Years of sch, total	8.2931	2.4480	1.3670	12.7490
Avg. Years of sch, female	7.9884	2.6595	0.8290	12.6090
Lagged income Gini	0.3630	0.0943	0.1900	0.6180
Fertility rate	2.3474	1.2266	1.1000	7.4350
GDP Growth rate	3.4845	3.5512	-11.3628	13.8657
Log of real per capita income	3.7266	0.5986	2.1629	4.6110
Ratio of Capital to GDP	22.5012	5.3312	9.6308	43.5862
Life expectancy	71.9553	6.2113	43.5153	80.5805
Education expenditure	4.4567	1.5786	0.9376	8.2987
Ratio of F/M primary enrollment	96.4501	8.7758	51.3350	103.3030
Rural Pop. Growth	-0.1372	1.3377	-5.4852	3.3113
Square of rural Pop. growth	1.7994	3.3168	0.0002	30.0873
Primary enrollment	101.8118	11.2020	52.0660	136.6627

Note: The unbalanced panel of 69 countries, the number of observations is 201 covering the five-year interval period during 1975 to 2005.

Appendix D: Scatterplot of bilateral correlations between independent and dependent variables



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