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The Correlation Between Education and Income Inequality

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Abstract: This paper analyzes the dynamics of wealth and education inequality in the world. This topic is very useful for the current economic situation. Meanwhile, the economic circle has different views on this issue by searching different literature. Each paper comes up with a different result and a different conclusion based on a different way of calculating economic inequality, and most scholars are divided into two groups, those who think they are strongly related and those who think they are not deeply related. These papers use some special calculations to calculate economic inequality. After analyzing the experimental process and results, it was found this issue and came up with personal views. In opinion, education does have a great impact on the economic situation of the middle class, but for the richest group of people, education has little impact on them. However, this research result still has some defects, so researchers need to consult more pieces of literature and obtain more data to obtain a more accurate result, which would greatly improve the level of economic inequality and extreme poverty in the world.

Keywords: Education, Income, Inequality, Literature Review

1. Introduction

According to the International Monetary Fund, both extreme poverty and extreme wealth continued to rise during the pandemic, thus wider the gap between the rich and the poor. From the data in World Inequality Report 2022, the top 10% of the population in terms of wealth earns over half the global income, with the bottom 50% earning just 8.5% of the total global income [1]. For this phenomenon, many commentators argue that the widening income gap between college-educated and uneducated people is a major cause of rising inequality in the whole world. Therefore, to solve the problem of world economic inequality, studying the correlation between educational difference and economic difference can help the government find solutions to address this problem and greatly improve the world inequality situation. It also contributes to the stability of world political power and the growth of the world economy. Therefore, it is necessary and worthwhile to study the bond between education and income inequality. Different literature on this subject has mixed results with some experts saying there is a strong relationship and others saying there only has a weak bond. For this question, different experimental results can be obtained by different experimental methods. In this article, an analysis of some experimental results in the literature to find a reasonable answer will be presented.

2. Re-Examination of Evidence

Some researchers believe that educational inequality can directly lead to economic inequality.

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One paper makes a quantitative review of the literature on the influence of education on inequality.

This paper purpose is to re-examine some evidence through different literature reviews. Moreover, this paper provides a clear review of the existing econometric paper through the meta-regression analysis (MRA) of 64 empirical studies, these papers report 868 estimates of the impact of teaching level on overall difference. Although there are more than 2,000 articles on the relationship between education and inequality, meta-analysis needs more estimates. The final study takes the following several criteria:

- Econometric guesses of the report:

Meta-analysis in economics contain compilation. Regression results from past studies [2]. Because of that, only empirical studies that provide suitable results are added in the data set. The standard didn't contain many early reports, which made the first research on education and inequality, such as Soltow [3], Stiglitz [4], and Anderson [5], since they did not provide available mathematical support. Adopting the econometrics or regression method, Anderson [5]and Stiglitz [4] are theoretical studies.

- Wealth inequality and education are two different variables:

Econometric research must use difference as a dependent variable and at least one educational calculation as an explanatory variable. So in order to be contained in the data set, the guesses inequality equation needs to be a variant of the following general specification:

$$I = \propto + \beta Edu + \beta_x Z_x + \mu$$

Where I is inequality, Edu is education, Z is the vector of other explanatory variables, and μ is the Error term. According to the standard, Muller [6] and Checchi [7] and many other studies were excluded, because although these studies explored teaching level and difference, difference is not a dependent variable.

On the contrary, difference explains variables. Some famous studies, such as Becker and Chiswick, Timbergen, and Marin and Psacharopoulos were also not contained because these reports used teaching level as a dependent variable. At last, because this paper is concerned with wealth difference, the study of property difference and input difference should not be contained.

- Overall income difference:

This paper focus on aggregate correlation, the relationship between input and teaching level. The equation of Mincer [8] is almost the most important. According to this framework, income difference is partly determined by the level of education. Many studies have shown that teaching level on inequality had used Mincer's method to find the correlation between education and income inequality. However, the research based on Mincer's method is not included in the metadata set, because these refer to income differences between individuals or workers, not gross wealth inequality. Due to that, many reports like this are excluded. The meta-analysis, which is a selection criterion, is unlikely to bias the answer because this paper discusses the comprehensive effect of education.

3. MRA Results

After using the results of several econometric studies, the MRA produced many interesting results:

- Firstly, teaching level seems to have the most impact on the two tails of wealth difference, dropping the input share of the rich people and rising the input share of the poor people. Therefore, researchers can get the answer that education has reduced the gap between the rich people and the poor people. Teaching level seems to not affect the proportion of the middle class. Thus, from MRA, on average, education is a useful tool to reduce wealth inequality.

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Table 1: Reports Included in the Meta-Regression Analysis, Abdullah, Doucouliagos, and Manning.[9]

Author(s)	Sample Coverage	Time Period	Author(s)	Sample Coverage	Time Period
Ahluwalia (1976)	All countries	1960s-1970s	Gupta, Davoodi and Terme (2002)	All countries	1980-1997
Ahluwalia (1976a)	All countries	1960s-1970s	Higgins and Williamson (1999)	All countries	1960s-1990s
Aigner and Heins (1967)	US	1960s	Janvary and Sadoulet (2000)	US	1970-1994
Ashby and Sobel (2007)	US	1980-2003	Jha (1996)	All countries	1960-1992
Barro (2000)	All countries	1960-1990	Keller (2009)	All countries	1970-2000
Beck et.al (2007)	All countries	1960-2005	Koechlin and Leon (2007)	All countries	1970-2001
Bourguignon and Morrison (1990)	Developin g countries	1960s-1980s	Kumba (2009)	Indonesia	1996-2005
Braun (1991)	US	1979	Lundberg and Squire (2003)	All countries	1960s-1990s
Breen and Penalosa (2005)	All countries	1960-1990	Motonishi (2006)	Thailand	1975-1998
Brempong (2002)	African	1993-2002	Nielsen and Alderson (1995)	All countries	1952-1988
Calderon and Chong (2009)	All countries	1970-2000	Nord (1980)	US	1960-1970
Carter (2006)	All countries	1975-2004	Nord (1980a)	US	1960-1970
Carvajal and Geithman (1978)	US	1960s	Nord (1980b)	US	1960-1970
Chambers (2010)	All countries	1960-1990	Odedokun and Round (2004)	African	1960s-1990s
Checchi (2001)	All countries	1970-1995	Papanek and Kyn (1985)	All countries	1952-1978
Chiswick (1971)	All countries	1950-1960	Park (1996)	All countries	1960s-1980s
Chong (2004)	All countries	1960-1997	Park (1998)	All countries	1960-2006
Chong, Gradstein and Calderon (2009)	All countries	1971-2002	Partridge, Partridge and Rickman (1998)	US	1960-1990
Cloutier (1996)	US	1979-1990	Perugini and Martino (2008)	European Union	1995-2000
Conlisk (1967)	US	1960	Pose and Tselios (2009)	European Union	1995-2000
Edwards (1997)	All countries	1970s-1980s	Psacharopoulus (1977)	All countries	1970s
Glaeser, Matt and Kristina (2009)	US	1980-2000	Ram (1981)	All countries	1970-1975
Gregorio and Lee (2002)	All countries	1960 and 1990	Ram (1984)	Developed countries	1970s
Gupta and Singh (1984)	All countries	1960-1970	Rodgers (1983)	All countries	1970

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- In addition, the distribution of teaching level is extreme essential. As the distribution of education become greater, the more serious the income inequality, it tells people that it's significant to give people fair educational opportunities. Some results also show that secondary teaching level may be more important than primary teaching level for reducing input difference.
- Furthermore, some essential territorial inequality in the effect of education is also in existance. MRA shows that teaching level in some Africa countries can reduce inequality in a more efficiency way than in Asia countries. More researches are needed to find the derive of this territorial difference in educational effect.
- Finally, about half of the changes in the estimated values in the report can be considered as the specific factors of the study, the differences in measurements, specifications, and data used in major econometric studies. By studying the design shape and the report endings, an important experiment will be the application of MRA to find the other factors which influence inequality, which will assist decision-makers in the cost-benefit analysis of alternative interventions [9].

4. Literature: Correlation Between Teaching level and Income Inequality

In another paper, some researchers hold the same points. When discussing the interrelationship between family background, ability, educational attainment, and labor market outcomes two underlying trends also need to be seen [10].

- The expansion of the British education system

There is an expansion in the British education system, especially higher teaching level, in short, Britain's demand for helium usually exceeds its supply, especially after the expansion of the supply side in the 1980s.

- The rise of income inequality during recent decades.

In the 1990s, the participation rate rose sharply. Such as in the figure 1, this graph indicates the increase of participation in higher education nowadays. The joining rate is very low. When in early 1960, there were about 6% of people aged 18 to 19, while the age group receiving higher education raised to one-third by 2010. The growth accelerated since 1990 but stayed stable after 2000.

This expansion has led to more people obtaining qualification certificates, especially advanced qualifications. Table 2 shows that since 1975, the education level of the labor force has improved. The figure uses the comprehensive data of family survey that reported the number of workers in five different levels.

The upper part of Table 2 shows the incidence of working men with diabetes. This figure grew from 5.8% in 1975 to 16.3% in 1998. At the same time, the employment rate of people who has higher vocational qualifications has increased from 4.7% to 12.1%. However, the most important thing is the decrease. The percentage of working people who have not academic qualifications drop from more than half (50.2%) in 1975 to less than 20% (18.9%) in 2010.

In the lower part of the table, the female pattern is more obvious. The proportion of women with degrees in the employed population has increased more than five times, from the initial 2.2% in 1975 to 12.5% in 1998. Interestingly, far fewer people became better in vocational education. Only 2.7% of working women got such qualifications in 1990 comparing with man. However, the number of experiences reflected men who have no qualifications has dropped sharply, from 58.3% in 1975 dropping to 23.3% in 1998. What is also worth mentioning is that the joining rate in secondary education after compulsory education has also grow. Graph 2 indicates the household expenditure survey information about the retention rate after the compulsory school-leaving age. In 1980s, it rose from 42% in 1979 to 52% in 1988. In 1990s, the change became larger and then gradually slower. By 1999, the rate of persisting in learning rose to 71%. The end of the rationing system in post-compulsory education may sharply raise it when the GCSE (General Certificate) examination system was implemented in 1988.

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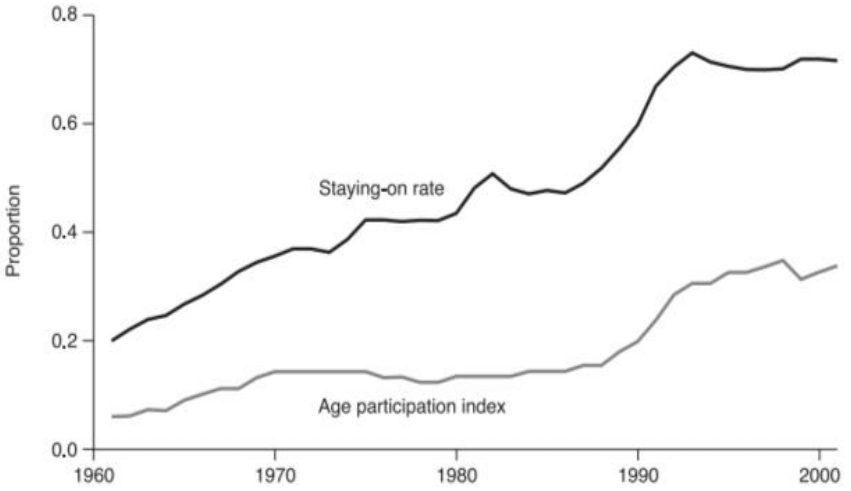

Figure 1: Education Participation over Time, Machin and Vignoles. [10]

Notes: The authors thank Damon Clark for passing the staying-on rates on to them. The higher education age participation index is the number of young (under 21) home initial entrants expressed as a proportion of the averaged 18- to 19-year-old population.
Source: Department for Education and Skills

Table 2: Employment Shares by Education, Machin and Vignoles. [10]

Per cent

	1975	*1980*	*1985*	*1990*	*1995*	*1998*
Men						
Degree or higher	5.8	8.2	12.1	12.5	15.5	16.3
Higher vocational	4.7	6.8	10.5	11.4	11.7	12.1
Teaching and nursing	1.2	1.3	1.4	1.2	1.3	2.0
Low/Intermediate	38.3	41.2	40.7	47.9	50.7	50.7
No qualifications	50.2	42.6	35.4	27.1	20.7	18.9
Women						
Degree or higher	2.2	3.6	6.2	7.5	10.8	12.5
Higher vocational	0.7	1.3	2.0	2.9	3.8	2.7
Teaching and nursing	5.8	6.8	8.4	7.9	7.4	7.7
Low/Intermediate	33.1	39.6	46.5	52.1	54.3	53.7
No qualifications	58.3	48.8	36.8	29.6	23.6	23.3

Source: Calculated from General Household Surveys. For 1975 through 1995, statistics are based on three pooled years, with the central year reported in the table.

5. Literature: No relationship Between Teaching level and Income difference

Other scholars argue that there may be no clear relationship between teaching level and input inequality. In this literature, the researchers calculated the percentage change in the participants' wages, assuming that their academic rank had increase.

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Table 3: The possibility of Inequality reducing the Income Gap by different percent [11]

	Inequality components				Adjusted	% Change
	h_w	h_{bp}	h_{be}	h	$h_{bp} + h_{be}$	adjusted
Observed	0.092	0.138	0.053	0.281	0.190	
Panel A: No shift in educational distribution						
Reduce gap in incomes by:						
10%	0.092	0.138	0.045	0.274	0.183	−3.65
25%	0.092	0.138	0.034	0.264	0.173	−8.96
50%	0.092	0.140	0.020	0.252	0.160	−15.72
Panel B: Shift 10% from < HS to College						
Reduce gap in incomes by:						
0%	0.082	0.124	0.047	0.253	0.171	−9.94
10%	0.082	0.124	0.040	0.246	0.164	−13.57
25%	0.082	0.125	0.029	0.236	0.154	−18.86
50%	0.083	0.126	0.015	0.224	0.141	−25.73
Panel C: Shift 10% from HS to Some College						
Reduce gap in incomes by						
0%	0.090	0.134	0.048	0.272	0.182	−3.92
10%	0.090	0.134	0.042	0.266	0.176	−7.18
25%	0.090	0.134	0.033	0.257	0.167	−11.95
50%	0.091	0.136	0.019	0.246	0.155	−18.14

Note: Adjusted inequality is total inequality minus within-person inequality

Table 3 uses statistics from the National Longitudinal Survey of Youth 1979 (NLSY79), it is an ongoing panel begin in 1979.It interviewed 12000 nationally representative samples which aged from 14 to 22. This paper uses h to calculate household income inequality, and μ is the average input overall observations, while the standard deviation is σ.

The formula for h is:

$$h = \frac{1}{2}(\frac{\sigma}{\mu})^2$$

In this situation, an NLSY79 respondent's income in a particular year is an observation. As mentioned earlier, these simulation results should be interpreted as the hypothetical result of the NLSY79 cohort if the world were different. Therefore, there is a limitation to this experiment. This leaves open the question of whether our simulations provide information about the likely impact of policy-driven or other factors on education. There seems to be a good reason to think that the findings from the NLSY79 cohort may have overstated the extent to which education can improve overall inequality.

In conclusion, although there are several perfect reasons to improve education, including increase equality of opportunity and more skilled workforce, however, reducing inequality may not be achieved in this way. A lot of the inequality in the world has been caused by a wide gap between the very rich people and the rest. Even excluding the top percentage of the income distribution, education influences only a little inequality, and any viable education reform is hard to improve income inequality.

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6. Personal Argument

Based on the previous demonstrations, even though experiments or surveys support that the correlation between education and income inequality cannot be explained, the education status and the inequality of domestic income should not be ignored. Taking China as an example, although China has been committed to the development of poverty alleviation in recent years, the income inequality rate in China is still growing year by year. However, the economic inequality among the middle classes has improved considerably. Like us around, more and more people can get great fortune through their efforts. Therefore, teaching level has a huge influence on the middle level of economic difference, but it doesn't close the gap between people and the top 10 percent.

In general, the relationship between economic inequality and education should be treated according to the situation. In some classes, it has only a small impact, while in most cases, education has a great role in promoting the economy and can effectively solve the problem of economic inequality. However, the whole experiment still needs to overcome a lot of resistance to understand the relationship. There are too many uncertainties and errors, and everyone has different views on education, some people are more willing to learn, while others are more resistant to learning, and the quality of education is also a tricky issue. The influence of time on education and the length of experimental studies are also difficult to control, and researchers need to conduct deeper studies and better preparation to obtain more accurate results.

7. Conclusion

When writing this paper and doing research, different papers are used on this subject and analyzed their experiments, data, and results. Although the results of many experiments were different, they all expressed a central idea that, in general, economic inequality and educational inequality are to some extent closely related. This experience also strengthened personal ability to search papers and analyze them. Meanwhile, algorithms of economic inequality are also be built, they are different from each other, but will eventually be used to express the degree of economic inequality in the form of data. Personal inductive ability, calculation ability, and analysis ability have been greatly improved. Also, from personal perspective, as education and income inequality correlate with each other to some extent, governments, social organizations, and families must eliminate the income gap to provide equal educational opportunities to the next generation.

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