국제학석사학위논문

A Nexus between Universal Primary Education and Poverty Reduction:

A Case Study of Latin America

초등교육 보편화와 빈곤퇴치의 상관관계:

중남미 사례연구 중심으로

2015년 8월

서울대학교 국제대학원

국제학과 국제지역학전공

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A Nexus between Universal Primary Education and Poverty Reduction:

A Case Study of Latin America

Thesis by

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Graduate Program in International Area Studies

In Fulfillment of the Requirements

For the Degree of Master of International Studies

October 2015

Graduate School of International Studies

Seoul National University

A Nexus between Universal Primary Education and Poverty Reduction:

A Case Study of Latin America

초등교육의 보편화와 빈곤퇴치의 상관관계:

중남미 사례를 중심으로

지도교수 김종섭

이 논문을 국제대학원 석사 학위논문으로 제출함

2015년 7월

서울대학교 국제대학원

국제학과 국제지역학 전공

안미선

안미선의 석사학위논문을 인준함

2015년 7월

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ABSTRACT

A Nexus between Universal Primary Education and Poverty Reduction: A Case Study of Latin America

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This paper studies a correlation between universal primary education and poverty reduction by cross-sectional regression analyses with data of 99 countries in period 2001-2012. The results show that access to higher level of education than primary level contributes to better income distribution and poverty reduction. While primary education enrolment rate does not show significance in correlation with Gini index or poverty gap, quality of primary education affects poverty index. Quality primary education is a prerequisite to mitigate income inequality and severeness of poverty.

Latin America case also supports the result. Among countries in this region, representatively, Chile with higher enrolment in secondary school and better quality in primary education exhibits low incidence of poverty.

Quality of primary education is a crucial factor affecting poverty. In order

to improve students' achievement, therefore to accumulate human capital which is a key to solve poverty problem, efforts to improve the quality of education should be made.

This paper is structured as follows. Chapter 1 describes the reasoning behind that international attention has paid to "*universal access to primary education.*" Chapter 2 presents literature review on the relationship between education (especially primary education) and poverty. Then, Chapter 3 introduces methodology and data this paper adopted to answer the research questions. Chapter 4 examines the results of 4 cross-sectional analyses, on the correlation at large between primary education and first, Gini coefficient, second, poverty gap. Chapter 5 includes case study on Latin American primary education and its impact on poverty, then the paper finally concludes with future policy implications.

Keywords: Universal Primary Education, Poverty Reduction, Income Inequality, Quality Education, Cross-sectional Regression, Latin America

Student Number: 2009-23776

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CHAPTER 1. INTRODUCTION

1.1 Background

World Education Forum was held in May 2015 in Korea. It was a place for discussion assessing whether last 15 years has achieved an "Education for All (EFA)" goal which was set at World Education Forum 2000 in Dakar, and seeking the post-2015 development agenda.

EFA which primarily emphasizes achievement of universal primary education is also the second goal of UN Millenium Development Goals. Moreover, EFA initiative which was launched by UNESCO has been supported by World Bank, UNDP, UNICEF and other multiple donors. The EFA goals and MDGs are complementary.

Then why has education, especially primary education long been on agendas of international meetings and developments agencies? We can find the answer by paying attention to the anticipated relation between education and poverty reduction.

According to several documents that World Bank published, education plays a crucial role in the fight to combat poverty.[1] Also the Poverty Reduction Strategy Papers (PRSPs) which was created in 1999 by the World Bank and the International Monetary Fund (IMF) attribute a key role to education both for reducing poverty and for achieving development.[2]

In the struggle against poverty, education appears as one of the key

1) World Bank, 1999a, b, 2001, 2004
2) WB, IMF, 1999

mechanisms for facilitating the social insertion and employment of excluded communities, providing them with abilities that they require to be individually independent. Given the importance of education as a tool for the training of human capital and potential social mobility, prioritizing educational investment to overcome poverty is a legitimate and necessary goal.[3)]

Especially in developing countries, primary education has been highly accentuated than other stages of education. Investment in primary education is less costly than that in higher education. Also, investment in primary education is more appropriate way to increase the literate and the numerate, comparing opportunity costs of investment in each stage of education. Simply put, primary education is a cost-effective way to combat with poverty in developing countries.

In fact, there were substantial improvements in net enrolment ratio in primary education, according to EFA Global Monitoring Report 2015. The world primary adjusted net enrolment ratio increased from 84% in 1999 to 91% in 2007.

As shown in table 1.1, low income countries and lower middle income countries which can be categorized into ‘developing countries’ have made significant progress in primary adjusted net enrolment.

In region, sub-Saharan Africa recorded 20% point increase in primary adjusted net enrolment, which is considerable progress, although it is still far from achieving universal.

3) X. Bonal, 2004, pp 650-651.

Table 1.1 Key indicators for universal primary education

	Primary adjusted net enrolment ratio		Out-of-school children		Survival rate to last grade of primary education	
	1999 (%)	2012 (%)	Change since 1999 (%)	Female (%)	1999 (%)	2011 (%)
World	84	91	-45	53	75	75
Low income countries	60	83	-46	55	56	57
Lower middle income	80	90	-48	52	69	70
Upper middle income	94	95	-42	53	85	88
High income	96	96	-9	45	93	95
Sub-Saharan Africa	59	79	-30	56	58	58
Arab States	80	89	-43	58	82	83
Central Asia	95	95	-22	52	97	98
East Asia/ Pacific	95	96	-42	47	85	92
South/ West Asia	78	94	-73	48	64	64
Latin America /the Caribbean	93	94	-6	47	77	77
North America /Western Europe	98	96	108	47	92	94
Central/Eastern Europe	93	96	-53	48	96	95

Source: Unesco EFA 2015 Monitoring Report

Then here is the main question that this paper starts with: Does increased primary education really help poor people to be out of poverty trap? Is expansion of primary education enough in struggle with poverty?

1.2. Research Question

Having World Education Forum ahead, it is meaningful to assess the result of EFA initiative. Moreover, since World Bank concentrate its effort on primary education as a mechanism in the struggle against poverty, I would like to examine the relationship between primary education enrolment and poverty reduction.

According to the PRSPs, a definition of poverty is related to the lack of certain dimensions of welfare: opportunities, capabilities, security and empowerment.[4] This definition widens the scope of poverty to non-monetary aspects. However, since non-monetary aspects are hard to measure, in this paper I will look into 1) Gini coefficient index and 2) poverty gap as poverty indicators, of which data is available at World Bank database. I will explain the meaning of these indicators more later in the methodology section.

Thus, this paper addresses 2 research questions,

a. Does increased primary education enrolment lower Gini-coefficient index? In other words, does equality of opportunities in getting basic education lead to equality in terms of earning income?

b. How do primary education affect poverty gap? Does expansion of primary education alleviate poverty gap?

4) A. Tarabini, J. Jacovkis, 2012, pp 508.

To answer research questions, this study uses cross-sectional data of total 99 countries[5], and with the collected data, it conducts regression analyses. For each regression, different countries are included, because of data availability. Then, to support the results of the analyses, I will do case study on Latin America region. Latin America has made an effort to expand the coverage of primary education with school incentive programmes including cash transfers, and actually it has achieved high rates (over 90%) of primary enrolment in recent years comparing to other developing regions. Latin America region also has long been notorious for its worse income inequality and high ratio of poverty, therefore to see whether its educational achievement has helped to alleviate poverty and how other educational environment is displayed in this region would be helpful to examine the relationship between primary education and poverty.

The rest of the paper is structured as follows: Chapter 2 presents literature review on the relationship between education (especially primary education) and poverty. Then, Chapter 3 introduces methodology and data I have adopted to answer the research questions. In Chapter 4, I will examine the results of 4 cross-sectional analyses, on the correlation at large between primary education and first, Gini coefficient, second, poverty gap. In Chapter 5, based upon regression analyses, I will do case study on Latin American primary education and its impact on poverty, then finally conclude with future policy implications.

5) List of countries is attached to Appendix B.

CHAPTER 2. LITERATURE REVIEW

Researches on the effectiveness of education as a tool to escape the poverty have been performed a lot. *Human Capital theory of development* is the one of the most representative theories which strongly supports the positive relationship between education and development. It is the basement theory that Universal Primary Education plan starts from. On the other hand, several papers evaluate an achievement of primary education regarding rates of return. Also some papers point out the inverse correlation, which means 'poverty affects to education,' not vice versa.

2.1. Human Capital Theory

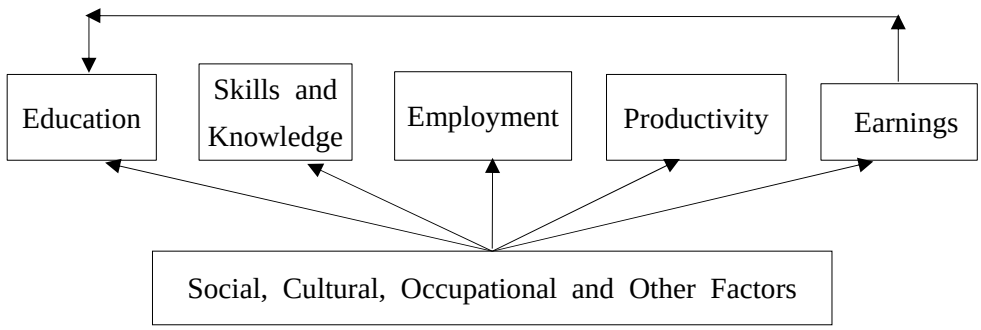
Theodre Schultz contended that population quality and knowledge constitute the principal determinants of the future welfare of mankind (Schultz 1961). Adding to this argument, Harbison and Hanushek (1992) addressed that a country which is unable to develop the skills and knowledge of its people and to utilize them effectively in the national economy will be unable to develop anything else. And according to Psacharopoulos (1985, p.5), education is widely regarded as the route to economic prosperity, the key to scientific and technological advancement, the means to combat unemployment, the foundation of social equity, and the spread of political socialization and cultural vitality.[6)]

In other words, Human Capital Theory regards education as the vehicle for

6) J. Chimombo, 2005, pp 130.

achieving economic growth, social justice, reduced disparities, and improved social welfare. For Latin America, the bold claim has been made that increased human capital could "totally eliminate the excess of inequality in the region" (Londoño, 1996).

Figure 2.1 Relationship between education and earnings in the human capital framework



Source: Tilak, Education and Poverty.

From these theoretical backgrounds, a number of governments in developing countries (African, Asian, Latin American regions) started to express their intention for Universal Primary Education. This trend led to Jomitien and Dakar Education For All (EFA) conference.

2.2. Relation between Primary Education and Poverty

Since it is hard to measure non-market external benefits that education brings to the society, many papers judge the effect of education in an economic term by calculating the rate of financial return on educational investment.

Colclough, Kingdon and Partrinos (2010) say the empirical evidence from the 1960s to the 1990s shows that wage returns in developing countries are larger at primary level than at secondary and higher levels of education. However, they contend that recent evidence suggests that the rate of return to primary education may now be lower than that to post-primary levels of education based on studies using cross-sectional data from the 1990s and early 2000s.

Carnoy (1999) also points out that the rates of return on education are higher for secondary and tertiary education than those for primary schooling. Bonal (2004) supports the aforementioned opinion, citing the Latin America trends 1990-1999. The increase in the number of pupils and the relative reduction in premature school leaving results in a tendency to lower the rates of return, he contends.

Bonal (2007) also addresses that without effective policies to counter inequality, education becomes just one more way in which inequalities are expressed and becomes another source of social differentiation. Here, quality of education matters. Low quality education makes it impossible for a student to gain the knowledge required in order to guarantee a good educational career and opportunities for social mobility.

Until now, I looked into the studies about the effects of education on poverty. However, there are also researches examining the effects of poverty on education. Bonal (2007) says that we should not underestimate this inverse relationship. Households in poverty could think opportunity cost for attending primary education is high, since the children should work for their family industry to meet the basic need of the family. Thus if education is in low quality and does not suit their needs, people especially

in poverty think education is not necessary. Here again, quality of education matters.

While some studies are conducted based on the assumption that opportunity cost of primary education is zero, Chimombo insists that the opportunity cost of school attendance is significant to whom live in marginal and inaccessible areas with poor infrastructure. Major factor directly linked to the problem of opportunity cost is poverty. Children of the poor are least apt to attend or complete school than children from better off families.[7] According to his assertion, poverty affects education.

However, Lockheed and Versepoor (1991) argue that improving the quality of education is the way to increase the demand of education. According to their argument, quality improvement in education increases the opportunity cost of not attending the school. Thus quality education can prevent poverty from affecting educational attainment. From their argument which also emphasizes quality of education, I assume that quality of primary education plays more prominent role in poverty reduction than increased access to primary education.

2.3 Hypothesis

Based upon research questions of this study and the literature review, I hypothesize,

a. Higher level of education (secondary and tertiary) than primary education contributes more to poverty reduction.

7) Chimombo, 2005, pp 132.

b. Quality of primary education plays more crucial role than expansion of primary education (increase in primary enrolment rate) in minimizing poverty.

In terms of poverty reduction, this study will specifically examine first, whether education has an equalizing effect in income distribution and second, whether it has an alleviating effect on depth of poverty, as mentioned in introduction chapter.

CHAPTER 3. METHODOLOGY

This section defines variables and presents the regression equations. To assess how primary education affect poverty, I conducted 2 cross-country regression analyses at large, one is to test correlation between primary education related variables and Gini coefficient index which shows degrees of income inequality, and the other is between primary education related variables and poverty gap. In detail, for each dependent variable, 2 types of regressions are conducted: Level of Education regression and Quality of Primary Education regression.

Data for the study are collected from 99 countries over 2001-2012 period. Two sub-periods are used with 6 year-span (2001-2006, 2007-2012), and average values of the variables are used for each period.

3.1 Income Inequality Regression

As a dependent variable, this study chose first, Gini-coefficient, second, poverty gap, in order to capture how education related variables affect poverty.

Gini-coefficient index[8] shows the state of income distribution of one's country. Income inequality, poverty and economic growth are inter-related, so affects each other directly and indirectly. As a way of reducing poverty, redistribution policy is still considered to be the most effective way in the

8) Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

significant number of countries.[9] Thus I find Gini-coefficient index can be a meaningful tool to observe the extent of poverty in a country.

3.1.1 Level of Education and Income Inequality

In order to see how primary education and other levels of education affects income inequality, following equation was developed:

$$GINI=\alpha 0+\alpha 1LnGDP+\alpha 2SqrtGDP+\alpha 3Rural\_POP+\alpha 4PRI\_enrol+\alpha 5SEC\_enrol+\alpha 6Tertiary\_gross+\alpha 7Dummy07\text{-}12+\varepsilon 1 \quad (1)$$

As control variables, LnGDP, SqrtGDP[10], and Rural_POP, which are the log of GDP per capita, squared value of logged GDP per capita and rural population ratio, are included in all equations. These variables are all relevant to income inequality and poverty gap according to previous studies.

Especially, rural population ratio is included since several studies point out that countries with higher population in rural area more tend to be poor. Also, In a regard that reaching the marginalized is essential to achieve universal primary education, we should pay attention to people living in rural area who are apt to be marginalized. Therefore, rural population ratio is included in the regression studying the relationship between education and poverty.

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9) Naschold, 2002, pp 2.

10) I used a squared value of logged GDP per capita as another variable based on Kuznets' inverted U shaped hypothesis for the relationship between income inequality and income per capita.

To study which level of education affects income inequality, enrolment rate of primary, secondary education and tertiary gross rate are included as independent variables.

Dummy07-12 is time dummy for 2007-2012 period and ε is the random error term.

3.1.2 Quality Primary Education and Income Inequality

On the assumption that quality of primary education is far more important than the expansion of primary education (an increase in primary enrolment rate) to mitigate income inequality, this equation was developed:

$$GINI=\beta 0+\beta 1LnGDP+\beta 2SqrtGDP+\beta 3Rural\_POP+\beta 4PRI\_enrol+\beta 5pupil\_teacher+\beta 6Repetition+\beta 7Dropout+\beta 8Literate+\beta 9Dummy07\text{-}12+\varepsilon 2 \quad (2)$$

As variables reflecting a quality of primary education, pupil-teacher ratio, repetition rate, dropout rate, and literacy rate are included:

First, pupil-teacher ratio is the number of pupils enrolled in primary school divided by the number of teachers. A significant rise in the gross enrolment ratio far outstripping any increase in teacher numbers raises serious concern for education quality.[11)]

Repetition rate and dropout rate can be reflective indicators of educational quality. Higher quality schooling with effectiveness will lead to lower repetition rate. In this sense, a dropout rate also reflects quality of education, since students would quit the school if they think it is

11) UNESCO, 2015, pp 196-217.

unnecessary to take the class comparing its opportunity cost.[12)]

Literacy rate is also included as a quality variable, since one of aims of primary school is to make students be literate before they leave the school.

There are other possible indicators of quality of education, such as a ratio of trained teachers, teachers' salary, availability of textbooks, ratio of public spending on primary education per GDP, educational expenditure per pupil, as well as a score of learning assessments. However, because of data shortage, only variables mentioned above are included in this study.

3.2 Poverty Gap Regression

Based on $1.25 a day poverty line[13)], poverty gap is a mean shortfall from the poverty line (counting the non-poor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.[14)]

While Gini-coefficient reflects income inequality prevailed among the population, poverty gap measures poverty deficit which is the per capita amount of resources that would be needed to bring all poor people, who do not even enjoy the basic need of life ($1.25 a day), above the poverty line. Thus, poverty gap shows severity of poverty in a country.

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12) Lee, 1997, pp 18-19.
13) World Bank defines living on less than $1.25 per day as extreme poverty.
14) World Bank's definition of poverty gap 1.25. Data are extracted from World Bank.

3.2.1 Level of Education and Poverty Gap

Except a dependent variable, control variables and explanatory variables are same with equation (1):

$$Poverty\_Gap=\gamma 0+\gamma 1LnGDP+\gamma 2SqrtGDP+\gamma 3Rural\_POP+\gamma 4PRI\_enrol+\gamma 5SEC\_enrol+\gamma 6Tertiary\_gross+\gamma 7Dummy07\text{-}12+\varepsilon 3 \quad (3)$$

3.2.2 Quality Primary Education and Poverty Gap

Also on the assumption that quality primary education affects poverty reduction rather than increased coverage of primary education, following equation is developed:

$$Poverty\_Gap=\delta 0+\delta 1LnGDP+\delta 2SqrtGDP+\delta 3Rural\_POP+\delta 4PRI\_enrol+\delta 5pupil\_teacher+\delta 6Repetition+\delta 7Dropout+\delta 8Literate+\delta 9Dummy07\text{-}12+\varepsilon 4 \quad (4)$$

All variables used in 4 types of regression are summarized in the table below.

Table 3.1 Variables for Regression

	Dependent Variable	**Description**
Regression 3.1	Gini Coefficient	Income distribution among individuals or households
Regression 3.2	Poverty Gap	Poverty gap at $1.25 a day (PPP) (%)

Independent Variables	Description
Log of GDP per capita	Average income per capita (in constant 2000 $US)
Square of Log of GDP per capita	
Rural Population Ratio	Ratio of people living in rural area to total population
Education Level	
Primary School Enrolment Rate	Ratio of students enrolled in primary school to children of official school age
Secondary School Enrolment Rate	Ratio of students enrolled in secondary school to children of official school age
Tertiary Enrolment Gross Ratio	Ratio of tertiary enrollment, regardless of age, to the population of the age group that officially corresponds to the level of tertiary education
Primary Education Environment (Quality of Primary Education)	
Pupil-teacher Ratio, Primary	Number of pupils enrolled in primary school divided by the number of primary school teacher
Repetition Rate, Primary	Ratio of sum of repeaters in all grades to the number of total enrolled students in primary school
Dropout Rate, Primary	Cumulative dropout rate in all grades (100-survival rate)
Literacy Rate	Percentage of people 15+ who can read and write

CHAPTER 4. EMPIRICAL ANALYSIS

4.1 Income Inequality Regression

4.1.1 Level of Education and Income Inequality

For controlling variables, the log of GDP per capita and its square are included in order to capture the inverted U-curve proposed by Kuznets for the relationship between income distribution and the level of income. Kuznets' inverted U-curve means that income distribution becomes more unequal with high levels of income up to a certain range and then starts to equalize. In this regression, both of the log of GDP per capita and the square of it exhibit significance, with the negative signs of correlation.

Rural population ratio also shows 1% level of significance in all models using equation (1). However, breaking expectation that higher rural population ratio would aggravate income inequality, it has negative impact on Gini index, which means it has positive equalizing effect on income distribution.

For 'Level of Education' variables, first, it appears that primary education enrolment does not have significant effect on income inequality. However, secondary enrolment and tertiary gross rate are significant and negatively signed. In other words, higher enrolment in higher level of education than primary lead to a more equal income distribution.

Several previous studies support this result. Gregorio and Lee examined how income distribution is related to the average level of educational attainment and they conclude that an increase in the average level of education has an

equalizing effect on income distribution.[15)]

Also, an increase in enrolment rate of primary school does not instantly mean accumulation of human capital. Morrison states that essentially, human capital theory assumes that “investment in primary education is supposed to result in the acquisition of the same basic reading, write and arithmetic skills. It is also assumed that this stock of knowledge allows individuals to obtain employment at a given wage level, which, might, for instance, be twice that of the jobs available for an illiterate person. These two assumptions lead to a simple, stable relationship between an expenditure in favor of a child from a poor household and the future earning potential which will lift that child above the poverty line (Morrison. 2002, p.6).”

From his statement, I found that quality of education is crucial to look at since schooling cannot be a tool for overcoming poverty, if it does not help students acquiring the knowledge and skills required in the labor market.

Time dummy does not show a significant result. Trends in 2007-2012 does not differ from previous period, 2001-2006.

15) Gregorio, Lee, 2002. pp 395-406.

Table 4.1 Regression for Effect of Level of Education on Income Inequality

Dependent variable: Gini Coefficient				
Independent variables	(1)	(2)	(3)	(4)
Constant	(-1.957)*	(-1.944)*	(-2.260)**	(-2.490)**
Control variable				
Log of GDP per capita	-5.425*** (-3.571)	-5.513*** (-3.497)	-5.521*** (-3.648)	-5.595*** (-3.815)
Square of log of GDP per capita	4.767*** (3.085)	4.867*** (3.010)	5.072*** (3.265)	5.247*** (3.483)
Rural population ratio	-0.345*** (-2.663)	-0.342*** (-2.626)	-0.336*** (-2.686)	-0.331*** (-2.733)
Time dummy				
2007-2012	-0.053 (-0.682)	-0.054 (-0.686)	0.009 (0.117)	-0.008 (-0.106)
Level of Education variable				
Primary education enrolment rate		-0.020 (-0.219)	0.046 (0.516)	0.047 (0.538)
Secondary education enrolment rate			-0.357*** (-3.492)	-0.261** (-2.510)
Tertiary gross rate				-0.272*** (-3.066)
Adjusted R^2	0.269	0.264	0.322	0.363
No. observations	137	137	137	137

(T-statistics for coefficients are in parentheses. Superscripts *, **, *** correspond to a 10%, 5%, and 1% level of significance.)

4.1.2. Quality Education and Income Inequality

For control variables, GDP and rural population ratio have a significant negative effect on Gini coefficient, which are the same result with equation (1) models. Primary education enrolment rate shows no significance also in this model.

While the enrolment rate does not show correlation with income inequality, the result with quality variables of primary education has great implication.

Pupil-teacher ratio shows positive sign, meaning that class environment with relatively large number of students per a teacher would aggravate income inequality.

Higher repetition rate and dropout rate as well worsen inequal state of income distribution.

Literacy rate has minus sign of correlation, but at no significant level.

These results show the role of education, especially quality education in income inequality. Countries of higher quality education also have a more equal income distribution. It implies that low quality education (even though with more students are enrolled, which means expanded coverage of primary education) makes it impossible for a student to gain the knowledge required in order to guarantee opportunities for social mobility, and therefore exacerbates unequal state of income distribution.

Table 4.2 Regression for Effect of Quality of Primary Education on Income Inequality

Dependent variable: Gini Coefficient				
Independent variables	(5)	(6)	(7)	(8)
constant	(-4.142)***	(-3.279)***	(-3.351)***	(-2.718)***
control variable				
Log of GDP per capita	-8.447*** (-5.051)	-7.079*** (-4.292)	-6.928*** (-4.308)	-7.703*** (-3.804)
Square of log of GDP per capita	8.268*** (4.790)	6.796*** (4.006)	6.683*** (4.052)	7.126*** (3.459)
Rural population ratio	-0.368*** (-3.063)	-0.301** (-2.464)	-0.360*** (-3.042)	-0.348*** (-2.872)
Primary education enrolment rate	0.012 (0.137)	-0.022 (-0.255)	0.001 (0.011)	0.009 (0.093)
Time dummy				
2007-2012	-0.012 (-1.541)	-0.042 (-0.557)	-0.073 (-0.989)	0.066 (0.741)
Quality of Primary Education variable				
Pupil-teacher ratio	0.576*** (5.527)			
Repetition rate		0.430*** (5.267)		
Dropout rate			0.528*** (5.980)	
Literacy rate				-0.136 (-1.368)
Adjusted R^2	0.365	0.353	0.386	0.218
No. observations	133	133	133	133

(T-statistics for coefficients are in parentheses. Superscripts *, **, *** correspond to a 10%, 5%, and 1% level of significance.)

4.2 Poverty Gap Regression

4.2.1 Level of Education and Poverty Gap

Log of GDP per capita and its square illustrate 1% level of significance in correlation with poverty gap. However, their directions of correlation differ from those with Gini coefficient. This result shows that Kuznets curve also exists in the relationship between a level of income (GDP per capita) and poverty gap. Poverty gap becomes wider with higher levels of income up to a certain point then starts to be narrower.

Rural population ratio shows less significance, however, with a positive relationship between rural population ratio and poverty gap.

For level of education variables, first, like Gini coefficient regression results, primary education enrolment rate is insignificant in determination of poverty gap.

However, enrolment rate of secondary and tertiary gross rate exhibit negative impacts on poverty gap in a 1% level of significance. To put it in another way, higher secondary enrolment and tertiary gross rates reduce poverty gap while expansion of primary education shows no visible effect. From this result, we can assume that the higher the level of education of the population, the lower the poverty gap of the country, since higher stage of education imparts knowledge and skills that are associated with higher earnings.

Table 4.3 Regression for Effect of Level of Education on Poverty Gap

Dependent variable: Poverty Gap				
Independent variables	(1)	(2)	(3)	(4)
Constant	(6.212)***	(6.036)***	(6.171)***	(6.525)***
Control variable				
Log of GDP per capita	8.055***	8.029***	8.052***	8.952***
	(5.899)	(5.690)	(6.042)	(6.330)
Square of log of GDP per capita	-8.481***	-8.450***	-8.300***	-9.180***
	(-6.085)	(-5.822)	(-6.052)	(-6.382)
Rural population ratio	0.079	0.079	0.065	0.036
	(0.660)	(0.659)	(0.574)	(0.304)
Time dummy				
2007-2012	0.111	0.111	0.021	0.067
	(1.598)	(1.589)	(0.302)	(0.955)
Level of Education variable				
Primary education enrolment rate		-0.007	0.068	0.035
		(-0.079)	(0.825)	(0.410)
Secondary education enrolment rate			-0.353***	
			(-4.042)	
Tertiary gross rate				-0.314***
				(-2.785)
Adjusted R^2	0.400	0.395	0.460	0.426
No. observations	155	155	155	155

(T-statistics for coefficients are in parentheses. Superscripts *, **, *** correspond to a 10%, 5%, and 1% level of significance.)

4.2.2 Quality Education and Poverty Gap

For control variables, the result shows the same direction of effects with the former regression model.

After controlling other variables, repetition rate and dropout rate show positive effects on determining poverty gap, meaning that high rates of repetition and dropout aggravate the severity of extreme poverty.

In this model, literacy rate displays an adverse effect on poverty gap at 5% level of significance. While literacy rate does not show noticeable correlation with income inequality, it does contribute to minimize the poverty gap. In fact, Tilak(2002) addressed the incidence of income poverty is the largest among the illiterate households, and illiteracy rate declines consistently by increasing levels of education in developing countries.

However, pupil-teacher ratio does not show a statistically significant result.

Table 4.4 Regression for Effect of Quality of Primary Education on Poverty Gap

Dependent variable: Poverty Gap			
Independent variables	(5)	(6)	(7)
constant	(4.224)***	(5.009)***	(5.283)***
control variable			
Log of GDP per capita	6.378***	7.760***	8.602***
	(4.348)	(4.846)	(4.868)
Square of log of GDP per capita	-6.579***	-8.134***	-9.175***
	(-4.335)	(-4.931)	(-5.043)
Rural population ratio	-0.046	0.017	-0.042
	(-0.517)	(0.164)	(-0.384)
Primary education enrolment rate	0.062	0.030	0.120
	(0.909)	(0.392)	(1.239)
Time dummy			
2007-2012	0.002	0.057	0.0801
	(0.041)	(0.879)	(1.129)
Quality of Primary Education variable			
Pupil-teacher ratio	0.660***		
	(7.482)		
Repetition rate		0.290***	
		(3.468)	
Dropout rate		0.161*	
		(1.626)	
Literacy rate			-0.234**
			(-2.057)
Adjusted R^2	0.695	0.622	0.542
No. observations	115	115	115

(T-statistics for coefficients are in parentheses. Superscripts *, **, *** correspond to a 10%, 5%, and 1% level of significance.)

CHAPTER 5. NEED FOR QUALITY PRIMARY EDUCATION IN LATIN AMERICA

5.1 High Primary Enrolment with High Income Inequality

As aforementioned, developing countries have prioritized investment in education since the estimated size of the return to education compares favorably with the return to investments in any other form of physical capital.[16] In this aspect, World bank also has pursued active projects relating to education with a particularly significant presence in sub-Saharan Africa and Latin America in which poverty and inequality has prevailed.

Owe these efforts, both regions have achieved a noted increase in primary enrolment rate (see Table 5.1). Especially in Latin America, primary education is now almost universally available, while sub-Saharan Africa still far left behind to meet the mandate of Universal Primary Education (UPE). However, up to the present, the contribution of universal primary education to overcome poverty is not quite visible in Latin America region.[17] As shown in Table 5.2 and Table 5.3, Latin America has recorded higher Gini coefficient than the world level, meaning that the distribution of income is highly polarized in this region.

16) Colclough, 2010, pp.734.
17) Bonal, 2007, pp.87

Given the results from previous chapter that higher level of education and quality primary education contribute to equalize income distribution, this chapter will inquire into possible reasons for high income inequality and prevailing poverty in spite of high primary enrolment rate, by looking into educational environment of the region.

Table 5.1 High Rate of Primary Education Enrolment in Latin America[18)]

	1999 (%)	2012 (%)
World	84	91
Latin America	94	95
Sub-Saharan Africa	59	79

Sources: UNESCO EFA Monitoring Report 2015

Table 5.2 High Income Inequality in Latin America

Gini coefficient	2001 (%)	2012 (%)
World	43.30	41.29
Latin America	53.63	47.51

Sources: World Bank Data Bank

Table 5.3 Gini Coefficient in Latin America Countries

	95-00 (%)	01-06 (%)	07-12 (%)
Bolivia	59.75	57.88	49.88
Brazil	59.57	57.57	53.85
Chile			51.42
Colombia	58.12	56.59	55.68
Costa Rica	46.44		49.15

18) Extracted from Table 1.1 in Introduction Chapter.

Dominican Republic	49.45	51.08	47.80
Ecuador	53.90	54.11	49.38
El Salvador	52.16	49.62	44.42
Guatemala	55.32	54.17	52.35
Honduras	55.34	57.81	54.85
Mexico	49.80	48.74	47.84
Nicaragua	45.24	41.77	45.73
Paraguay	55.88	54.22	50.87
Peru	49.65	51.13	46.44
Uruguay	43.14	46.54	45.04

Sources: World Bank Data Bank

Table 5.4 Poverty Gap in Latin America Countries

	95-00 (%)	01-06 (%)	07-12 (%)
Bolivia	13.57	9.59	4.89
Brazil	4.36	3.60	2.49
Chile			0.52
Colombia	9.52	4.89	2.90
Costa Rica	2.89		1.00
Dominican Republic	1.77	1.67	0.73
Ecuador	6.21	4.13	2.43
El Salvador	6.89	5.16	0.97
Guatemala	4.96	7.18	4.78
Honduras	10.69	11.31	5.63
Mexico	1.86	0.77	0.24
Nicaragua	3.14	2.00	2.93
Paraguay	4.15	2.95	1.71
Peru	4.17	2.97	1.08
Uruguay	0.19	0.21	0.08

Sources: World Bank Data Bank

5.2 Educational Inequality in Latin America

5.2.1 Need for Secondary Education

In Latin America, increasing levels of education has meant that primary education is almost universally available. However, according to CEPAL(2000), at least secondary education needs to be completed in order to achieve incomes that would take people above the poverty line. It also remarks that in Latin America, 12 years of schooling is a threshold required to escape the poverty trap.[19] For instance, in Latin America, most of whom have attained no more than 8 years of schooling only get low productivity jobs, with low incomes and a high risk of poverty, while those with 12 or more years of school attainment work as professionals with much higher incomes.[20]

In most of Latin America countries, distribution in income is highly polarized as shown in Table 5.3. However, Table 5.4 shows that in terms of poverty gap, Chile, Costa Rica, Dominican Republic, El Salvador, Mexico, Uruguay exhibit low incidence of poverty compared to the rest of the countries. Olavarria-Gambi (2003) cites that Chile, Costa Rica, and Uruguay are ranked in the top positions in UNDP Human Development Index (HDI) and Human Poverty Index(HPI). Especially Chile has been cited as a successful case in combat with poverty and he asserts that poverty of Chile was reduced in virtue of a comparatively high human capital accumulation. By contrast, Bolivia and Paraguay with high rates of poverty record low rank in HDI and HPI.

19) Bonal, 2007, pp.89.
20) Olavaria-Gambi, 2003, pp.104.

Table 5.5 Secondary Enrolment rate in Latin America Countries

	95-00	01-06	07-12
Bolivia		69.14	67.84
Chile			83.95
Colombia		62.69	72.93
Costa Rica	42.61		73.13
Dominican Republic	39.36	50.17	60.94
Ecuador	47.97	51.63	68.64
El Salvador	44.21	49.50	56.45
Guatemala	25.24	30.74	43.59
Honduras			
Mexico	51.58	62.22	67.18
Nicaragua	34.73	40.55	45.44
Paraguay	41.66	55.16	60.26
Peru	58.92	69.07	76.51
Uruguay			69.73

Sources: World Bank Data Bank

As shown in Table 5.5, Chile, with high human capital accumulation, has an outstanding rate in secondary education enrolment compared to others. Costa Rica and Uruguay also record relatively high secondary education enrolment rate. Contrary, Bolivia and Paraguay have relatively low secondary enrolment rates and even worse with Guatemala and Nicaragua.

This Latin America case tells that continuation of education to at least secondary level is required for poverty reduction. It supports the result of regression analysis conducted in previous chapter: while primary enrolment rate does not exhibit significance in correlation with poverty gap, higher level of education works to lower poverty gap.

However, in reality, in the transition between primary and secondary education, also during primary schooling, a number of students leave their

school prematurely in Latin America. For example, according to CEPAL (2002), in the best cases, in urban areas in Argentina, and Chile, over 20 % of pupils abandon their primary and secondary schools. In the worst areas, the rural regions of Bolivia, Honduras, and Mexico, the number reaches 67.1%. From this point, we can assume that educational expansion has not been accompanied by sufficient measures capable of keeping young children and adolescents at school. While access to primary education becomes fair to every child in Latin America, access to quality education is not guaranteed to everyone. Educational environment with low quality generates educational inequality, and this leads to income inequality.

5.2.2 Low Quality of Primary Education

Low quality education makes it impossible for a student to gain the knowledge required in order to guarantee a good educational career and opportunities for social mobility, which is the key for escaping the poverty.[21)]

However, in Latin America, the educational expansion was achieved at the compensate of giving up the quality of education.

High repetition rates and dropout rates in the region are related to inadequate learning and achievement. Chimombo (2005) quotes Hanushek's words (1995) that students tend to stay in good schools and dropout in poor ones. High repetition leads to increased dropout rates, higher costs per graduate, and the lack of space in primary schools, which worsen the quality of educational environment.[22)] This is vicious circle that should be

21) Bonal, 2007, pp. 97.

cut off and the starting point would be improvement of quality of primary education.

Table 5.6 2012 Primary School Repetition and Dropout rate in Latin America

	Repetition Rate	Dropout Rate
Bolivia	5.28	3.27
Brazil	8.75	19.33[23)]
Chile	4.69	1.33
Colombia	2.46	15.29
Costa Rica	5.33	12.28
Dominican Republic	8.01	8.86
Ecuador	1.56	11.20
El Salvador	6.36	16.21
Guatemala	12.24	33.27
Honduras	4.75	30.35
Mexico	2.89	4.25
Nicaragua	7.94	51.60
Paraguay	4.60	19.88
Peru	4.80	26.15
Uruguay	5.53	5.26

Sources: World Bank Data Bank

Table 5.6 shows the recent value of repetition and dropout rates in Latin America countries. Chile has a 1.33% dropout rate which is remarkable among high dropout rates exceeding 20% of Guatemala, Honduras, Nicaragua, Peru. As stated above, Chile is also renown for human capital accumulation with higher second enrolment rate, and lower poverty gap. Mexico and Uruguay show low rates of repetition and dropout, as well.

22) Wolff, 2002, pp.1-7.
23) Data for 2004-2012 Brazil dropout rate are missing. Data for 2003 is used.

By contrast, Nicaragua has 51.60% of dropout rate which is huge. According to UNESCO EFA 2015 Report, in Nicaragua, primary schools do not teach basic arithmetic in early years of students. In consequence, even in grade 4, 20% and 70% of students failed to identify numbers and solve a subtraction question, respectively.[24] This fact implies that Nicaragua has a quality problem in curriculum, and students respond to that with high dropout rate.

Scores of PISA[25] (Programme for International Student Assessment) also shows that knowledge of students in Latin America is staggering low. Table 5.7 shows the scores of PISA Math test.

Brazil, Argentina, Chile, Mexico, Uruguay - All Latin American participants improved their score in 2009 test compared to 2007 one, however, they still mark relatively lower than countries in similar level of economies. At least, Chile and Uruguay which have better educational environment exhibit better scores among Latin America participants. Despite the fact that Chilean fourth graders have ranked highly among Latin America countries, their performance is modest compared with students from developed countires or South East Asian nations. In response to the result, Chilean government concentrates its effort to seek *quality education for all*.[26]

24) UNESCO, 2015, pp.193.
25) PISA's target population is 15-year-old students in each country, regardless of the institution, and grade they currently attend. In PISA 2009, the latest assessment, 65 countries participated, including emerging economies. This test is constructed to test a range of relevant skills and competencies.
26) Olavarria-Gambi, 2003, pp. 114.

Table 5.7 PISA Math Test Score By Economies[27)]

Economy Scale	Participant Countries	2000	2009
Low Income	Indonesia	366.1	371.1
Lower-middle income	Brazil	332.8	386.0
	Bulgaria	429.0	427.9
	Romania	426.1	426.4
	Russian Federation	478.3	467.9
	Thailand	432.7	418.6
	Tunisia	358.9	371.5
	Turkey	423.8	445.7
Upper-middle income	Argentina	387.4	387.6
	Chile	382.9	420.7
	Czech Republic	493.3	492.6
	Hungary	483.3	490.0
	Latvia	461.7	481.5
	Mexico	386.8	418.5
	Poland	470.7	494.2
	Slovak Republic	498.6	496.7
	Uruguay	421.8	427.2
Average		477.3	477.7

Sources: Hanushek, Does School Autonomy Make Sense Everywhere? Panel Estimates from PISA.

Until now, I looked into few indicators of low quality of primary education, such as high repetition and dropout rates, as well as poor achievement of students in Latin America.

27) Participant countries are categorized into Low-income, Lower-middle income, Upper-middle-income, and High-income economies. High-income countries are excluded from this table, since no country in Latin America is high-income and it is meaningful to compare with countries in similar level of economies. Scores of High income countries range from 480 to 550 approximately. Republic of Korea records 545.9 in 2009. For more detailed information, refer to Hanushek(2012 a) pp. 9.

Then what are the reasons for such inefficiencies in schools of Latin America? And What efforts should be made to improve the quality of primary education?

5.3 Efforts for Quality Primary Education

5.3.1 Skilled Teachers for Improved Delivery of Education

UNESCO EFA 2015 report points out that poor, less-qualified, untrained teachers just to meet the mandate of universalization of primary education and inadequate support to poor children were to blame for increased rates of repetition and dropout in Brazil.[28)]

The shortage of skilled teacher is not the problem only restricted to Brazil. Unequal access to high quality teachers is the problem that developing countries confront with, and Latin America is not an exception. While there has been an improvement in pupil/teacher ratio, the ratio of pupils to trained and skilled teachers decreased in 2012 compared to that of 1999.[29)] In order to fulfill the international mandate of UPE, Latin America countries are utilizing the services of less qualified teachers appointed on a contract basis and given meager wages that are sometimes even lower than the government's minimum prescribed wage.[30)] Thereby, students in disadvantaged schools are often taught by teachers with less preparation than those in wealthier ones.

Consequently, this equity gap in quality of education results in high

28) UNESCO, 2015, pp. 83-84.
29) Refer to Figure 6.9 of UNESCO, 2015, pp. 199.
30) Pandey, 2009, pp. 52.

inequality of income distribution and severeness of poverty.

To solve the shortage of skilled teachers, UNESCO suggests incentive programmes for teachers. It says in the Republic of Korea, teachers in disadvantaged schools benefit from incentives, such as an additional stipend, smaller class size, less teaching time, the chance to choose their next school after teaching in a difficult area and greater promotion opportunities. It made 77% of teachers in remote areas have a higher qualification than a bachelor degree, compared with 32% in large cities, according to UNESCO 2015 Report.

5.3.2 Multilingual and Multi-cultural Education for Indigenous People

Language of instruction children do not understand also can be a factor of disadvantage for them who live in remote indigenous communities.

According to World Bank, in Guatemala, 86.6% of indigenous peoples are poor, while more than half of the total population is poor. Also in Mexico 80.6% of indigenous people are poor.[31] That means the degree of poverty is extreme, especially in indigenous communities, and we should consider specialities of indigenous communities in organizing the policies to reduce poverty in the country. Educational policies are no exception, since like said low human capital is a driving force behind high poverty rates.

In an effort to encourage educations in indigenous communuties, in Latin America, most countries, including Guatemala, Paraguay and Peru, have

31) Hall, Gillette. Patrinos, H. Anthony, 2005, pp.4.

intercultural bilingual education policies that aim to integrate indigenous languages into national education by allowing children to learn in their mother tongue before moving into Spanish.

However, obstacles for bilingual classes are a lack of textbooks and again a shortage of trained teachers using the both languages. Thus bilingual education remains with low quality, limited coverage and poorly qualified teachers. In an effort to improve the situation, teacher training programs for bilingual education have spread in Latin America. Bolivia, Ecuador, Peru, Chile, Columbia, Mexico and Argentina actively have been involving in this trend.[32)]

32) Hall, Gillette. Patrinos, H. Anthony, 2005, pp. 14-20.

CHAPTER 6. CONCLUSION

There has been ongoing debates about whether education contributes to poverty reduction. Especially in developing countries, expansion of primary education is highly pursued, since it is believed to play crucial role in combat with poverty.

This paper finds that an increase in enrolment rates of secondary and tertiary education have correlation with better income distribution and poverty reduction by cross-sectional regression analyses with data of 99 countries in period 2001-2012. Contrary, primary enrolment does not show a significant result in correlation with Gini coefficient or poverty gap.

However, quality of primary education is proved to be an important factor affecting poverty. Higher repetition rates and dropout rates, which are indicators of poor quality of education lead to deterioration of income distribution and poverty, while higher literacy rate affects to poverty reduction.

Latin America case also supports the result of empirical studies. Latin America shows high income inequality in spite of high primary enrolment rates near to universality. However, among the Latin American countries, countries with higher secondary enrollments and better primary educational environment, representatively Chile, show low incidence of poverty.

Through empirical studies and Latin America case study, I found that quality of school infrastructure and teaching is an important factor affecting poverty. Poor quality of primary education (shortage of skilled teachers,

absence of multi-cultural curriculums, effectiveness in teaching) hinders the role of education as an instrument of poverty reduction, in spite of expansion of primary education.

Increased access to primary education is still important to the poor. This paper does not deny its importance. If the poor cannot access to primary education, they would be in a worse position. Thus, it is still important to make an effort to increase the number of primary enrollments in countries with low rates of primary enrollment such as those in sub-Saharan Africa.

However, the problem is that as expansion has proceeded, the quality of school intakes may have changed. Good quality of primary education should be guaranteed to build high human capital accumulation, and therefore reduce poverty of the country.

Quality improvement in primary education would also results in increase in secondary enrollments, by reducing repetition rates and dropout rates of primary education, then building students' trust in effectiveness of education.

The focus of primary education policy has typically been on access to primary education. But, expanding access alone would be insufficient for education to contribute fully to social inclusion and poverty reduction. Quality of education is a prerequisite for achieving the goal of equity.

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APPENDIX

Appendix A. DATA SOURCES

Dependent Variable	Source
Gini Coefficient Index	World Bank Data Bank
Poverty Gap $1.25 per day	

Independent Variable	Source
Log of GDP per capita	World Bank Data Bank
Square of Log of GDP per capita	
Rural Population Ratio	
Primary School Enrolment Rate	World Bank Data Bank UNESCO Institute for Statistics
Secondary School Enrolment Rate	
Tertiary Enrolment Gross Ratio	
Pupil-teacher Ratio, Primary	
Repetition Rate, Primary	
Dropout Rate, Primary	
Literacy Rate	

Appendix B. ABBREVIATIONS

EFA Education For All

HDI Human Development Index

HPI Human Poverty Index

MDG Millenium Development Goal

PISA Programme for International Student Assessment

UPE Universal Primary Education

UNDP United Nations Development Programme

UNESCO United Nations Educational, Scientific and Cultural Organization

Appendix C.

LIST OF COUNTRIES BY REGIONAL GROUPS

East Asia Pacific			
Australia	Cambodia	Indonesia	Japan
Malaysia	Philippines	Thailand	Vietnam
Europe/ Central Asia			
Armenia	Azerbaijan	Belarus	Belgium
Bulgaria	Croatia	Denmark	Estonia
Finland	France	Georgia	Germany
Greece	Hungary	Ireland	Kazakhstan
Kyrgyz Republic	Latvia	Lithuania	Luxembourg
Macedonia, FYR	Moldova	Montenegro	Netherlands
Norway	Poland	Portugal	Romania
Russian Federation	Serbia	Slovenia	Spain
Tajikistan	Turkey	Ukraine	United Kingdom
South Asia			
Bangladesh	Maldives	Pakistan	Sri Lanka
Middle East/ North Africa			
Egypt, Arab Rep.	Israel	Jordan	Morocco
Tunisia	Yemen, Rep.		

Sub Saharan Africa			
Cabo Verde	Cameroon	Central African Rep.	Chad
Congo, Rep.	Cote d'Ivoire	Ethiopia	Gambia, The
Ghana	Kenya	Madagascar	Malawi
Mali	Mauritania	Niger	Nigeria
Rwanda	Senegal	Sierra Leone	South Africa
Swaziland	Togo	Uganda	Zambia
Zimbabwe			

Latin America/ Caribbean			
Argentina	Bolivia	Brazil	Chile
Colombia	Costa Rica	Dominican Rep.	Ecuador
El Salvador	Guatemala	Honduras	Jamaica
Mexico	Nicaragua	Panama	Paraguay
Peru	Uruguay	Venezuela	

North America
United States

국문초록

초등교육 보편화와 빈곤퇴치의 상관관계:
중남미 사례연구 중심으로

본 논문은 횡단면 회귀분석을 통해 초등교육 보편화와 빈곤퇴치의 상관관계를 알아보고자 하였다. 2001년과 2012년 사이 99개의 국가에서 수집한 데이터로 분석한 결과, 초등학교 입학률의 증가는 빈곤 지표인 수입 불평등과 빈곤갭의 감소에 영향을 끼치지 않았다. 초등교육이 인적자원 축적에 기여하고 이를 통해 빈곤을 퇴치하기 위해서는 질적 향상이 필수적인 것으로 파악된다. 높은 초등입학률에도 불구하고 수입 불평등이 만연한 중남미 지역의 사례 연구 또한 이러한 결과를 뒷받침한다.

이 논문의 첫 장은 국제적 관심이 초등교육 보편화를 향하게 된 배경에 대해 소개하고, 2 장에서는 크게는 교육, 작게는 초등교육과 빈곤의 상관관계를 연구한 문헌들을 다룬다. 3 장은 본 논문이 사용한 연구 방법론과 데이터에 대해 서술하고 네 번째 장에서는 4 가지의 횡단면 회귀분석을 통해 얻은 결과를 분석한다. 즉, 초등교육 입학률과 수입 불평등의 상관관계, 초등교육의 질과 수입 불평등의 상관관계, 또한 초등교육 입학률과 빈곤갭의 상관관계, 초등교육의 질과 빈곤갭의 상관관계에 대해 분석한다. 5 장은 4장의 결과를 뒷받침하는 중남미 지역 사례를 연구하며 6장에서는 본 논문의 요

약과 함께 질적 향상을 통한 초등교육의 나아가야할 방향에 대해 제시한다.

주요어: 초등교육 보편화, 빈곤퇴치, 수입 불평등, 교육의 질, 횡단면 회귀분석, 라틴 아메리카

학번: 2009-23776