

The Effect of Early Childhood Development in South Asia

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This paper aims to analyze the relationship between economic growth and early childhood development in South Asia. The human capital is considered as the major factor of high productivity. Education is likely to have a positive impact on economic growth. Most of developing countries are trying to increase enrolment of schools for economic development however, a large number of students dropping out of schools. In developing countries such as India, the more the government tries to increase enrolment, the more student dropout from education. We suppose that the early childhood development program would be an effective tool to stop the leak from schooling. In this paper empirical results show that early childhood development program has positive effect on economic growth in South Asian countries.

1 Introduction

Over 40 percent of India's children drop out of school before finishing 8th grade, despite a recent law designed to provide free and compulsory elementary education for all. Most students who quit school are from the lowest rungs of Indian society (UNESCO, 2007). This article studies one of the emerging question in education development: What is the impact of decline on school dropout? In this paper, we analyze the effect of early childhood development using two different analysis models with household-based data and country-level analysis with panel data.

It is considered that the human the major factor of high productivity, and education is likely to have a positive impact on economic growth. Most of

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developing countries are trying to increase enrolment of schools for economic development. However, a large number of students in those countries dropout from schools. We hypothesize that Early Childhood Development could lead economic growth by increasing human capital through reducing school dropout, infant mortality and increasing progression to secondary education. In developing countries such as India, the number of dropout students is increasing in Education for All movement. We suppose that the early childhood development program would be effective tool to stop the dropout from schooling. Empowerment or intervention in children younger than school-age would decrease dropout and would improve school efficiency. Education is very important factor of human capital formation and it plays fundamental part to increase human capital and to accelerate economic growth by improving skills, competency and productivity (Khiliji, Khan and Kakar, 2011). The education brings benefits for the whole society and the individuals. In developing countries, education plays a key role in poverty reduction, and removing both social and income inequalities. Most developing countries like Ethiopia, Tanzania and India are trying to improve access to schools followed by education for all (EFA) movement (UNESCO, 2007). However, dropout from schools is in the severe situation in primary schools; especially in the first grade and the final grade. Increase in dropout students would damage economic growth of its country.

According to UNESCO's EFA Global Monitoring Report 2008, out of 129 countries²⁾, 51 have achieved or are close to achieving the four most quantifiable EFA goals (universal primary education, adult literacy, gender equality and quality of education), 53 are in an intermediate position and 25 are far from achieving EFA as a whole, the EFA Development Index³⁾ shows. The lowest category would be larger still if data were available for a number of fragile countries, including conflict

²⁾ The countries are consisted of the 79 countries which data can be collected through UNESCO-UIS/OECD/EUROSTA questionnaire and World Education Indicators, and 50 least developed countries.

³⁾ The EFA Development Index (EDI) is a composite index that provides overall progress of national education systems towards EFA. The value of standard EDI for a given country is calculated by four components: primary adjusted net enrolment ratio, literacy rate for age 15 and above, gender-specific EFA index and survival rate to grade 5.

or post-conflict countries with very low levels of education development. As concerns early childhood care and education, the report pointed out: although child mortality rates have dropped, a majority of countries are not taking the necessary policy measures to provide care and education to children below age 3; the provision of pre-primary education for children aged three and above has improved but remains scarce across sub-Saharan Africa and the Arab states; ECCE programs generally do not reach the poorest and most disadvantaged children, who stand to gain the most from them in terms of health, nutrition and cognitive development. In India, pre-primary education in some states starts at the age of 4 years instead of 3 years. According to 93rd Constitutional Amendment, now the State shall have to endeavor to provide early childhood care and education for all children until they complete the age of six years.

To be clear with the terms used in this paper, here some important words in this paper are defined. Elementary education consists of eight grades and the primary level is from first to fifth/sixth grade. The term 'elementary education' is less ambiguous as it is better known internationally when the Universal Declaration of Human Rights was proclaimed. It referred to the first level of formal education. While the duration and contents of elementary education varied greatly among countries, it is broadly accepted as primary schooling aiming to provide for more than just the simple acquisition of literacy and numeracy. In the about 50 member states of the United Nations at the time, there were already existing constitutional and legislative requirements and in certain countries education was compulsory beyond the primary stage/level.

Between 1950 and 1970, enrolments to primary education bumped up all over the world, due to increasing social demand paired with political commitment. The three regional conferences on free and compulsory education organized by UNESCO in Bombay (1952), Cairo (1955), and Lima (1956) adopted a realistic position suggesting a gradual implementation of compulsory education. Also, common acceptance of schooling could not be made compulsory unless it was available and free of costs for the learner. Although the World Education Report 2000 warned that;

Elementary education did not intend to refer to any particular stage or level in the systems of formal education that were then in existence. It broadly meant an education that would give all children a good start in life.

Early childhood is defined as the period from birth to eight years old. A time of remarkable brain development, these years lay the foundation for subsequent learning. UNESCO advocates for Early Childhood Education and Care programs which include health, nutrition, security and learning provide for children's holistic development. ECCE is part of a range of programs that promote inclusive education.

The huge diversity of early childhood care and education provision is equaled by the diversity of terms used to define it. Countries and international institutions use different terms for early childhood care: early childhood care and education (ECCE); early childhood education and care (ECEC); early child and early childhood development (ECD); and early childhood education (ECE). The term ECD is used throughout this report, with a focus on the educational aspects of these services as opposed to the broader concept of care and education. Moreover, ECE in this report refers to services for the whole age range of children under-6 years, although with a focus on education rather than care, the spotlight (and most of the available information) is on the 3- to 6-year-old age group. For this reason, when discussing this age group, the paper also uses the term pre-primary education in line with UNESCO usage. The term ECE includes all kinds of education taking place before compulsory primary education (which begins at 6 years old in most countries) provided in different settings: nurseries, crèches, child-care centers, kindergartens, preschools, infant schools and other similar settings. A distinction has to be made between the under 3- and the 3- to 6-year-old age groups in essence between early childhood centers for the former and schools for the latter. Nearly half of the world's countries have formal ECE programs before age 3 years. These programs typically provide organized custodial care and, in some cases, health services and educational activities in day-care services, crèches and nurseries.

1.1 Literature Review

In this chapter, we review the previous studies on education development in South-west Asia. According to Nag and Kak (1984), in a Punjab village where in 1970 the farmers cited the labor value of children, particularly sons, in agriculture as the prime reason for having large families, the green revolution along with a few other institutional changes had drastically reduced the labor value of children and, as a consequence, their desire for large families. Caldwell and Reddy (1982) found higher aspiration of parents for their children's education is an important factor for the decrease in labor value and old age security value of children. The financial burden of direct costs of children is commonly cited by respondents in less developed countries when they are asked about their reasons for not wanting any more children or for limiting their family size (Arnold, et al., 1975). Educated parents are expected to be motivated more than the uneducated ones for the actual and perceived costs of their children.

Azarnert (2006) tried to analyze human capital accumulation with child fertility, parents' education investment. A Generalized Least Squares model is applied to a pooling data combining countries and time-series. The results indicated that education of females in secondary and primary levels, female labor participation and urbanization are negatively associated with fertility. The result showed that exogenous decline in child mortality lowers fertility and school dropout.

Dreher and Walter (2010) analyzed the effect of the IMF involvement on the risk of entering a currency crisis for analyzing the impact of education expenditures per worker on economic growth in the country using time-series analysis. On the empirical front, however, there is disagreement among researchers as to whether education expenditures are productive and therefore associated with higher per capita real GDP growth. Barro (1991) found a positive correlation between education expenditures and economic growth. Gemmill (1996) found both the levels of human capital and their growth rates to be important determinants of economic growth. Devarajan, Swaroop and Zou (1996) found negative correlations between the share of education expenditures in government budget and economic growth in most of their estimates. Benhabib and Spiegel (1994) found weak

evidence of a relationship between changes in educational attainment of the labor force and economic growth. Nonetheless, the weak statistical relationship between education and economic growth can be attributed to measurement errors and influential outliers in the cross-country sample. Blis and Klenow (2000) found that the causation from schooling to economic growth is too weak to produce the correlation coefficients obtained. They discovered reverse the causality from economic growth to schooling, arguing that anticipated economic growth reduces the effective discount rate thus increase the demand for schooling. They are of the view that the empirical evidence documented by Barro (1991) and primarily reflect no the impact of education on economic growth but economic growth on education. On the issue of instruments, Rodriguez and Rodrik (1999) pointed out that the instruments normally used are not valid ones.

These studies mainly focus on primary or secondary education and economic growth. The traditional variables such as the enrolment in formal education, education expenditure do not take account of high dropout. In this paper, therefore, relationship between ECD and dropout, economic growth on household level and country level are analyzed.

2 Model & Data

Early childhood care and education provides an important foundation for later learning and is an integral part of lifelong learning. In keeping with EFA orientations, governments and education providers need to ensure smooth transitions from ECCE to primary school so that the gains made in the former will be firmly sustained in the latter. (UNESCO, 2008) ECD has many effects to individuals and society. According to JICA (2004), we can classify the effects of ECD into roughly two groups, direct- and indirect-effects. The particular feature of that distinguishes this study from many existing papers in this context is the estimate models for these two; household-based and country level. To evaluate the effect of early childhood development in short and long time series, we used two models for analysis. The household-based model analyses the effect of early childhood development on

dropout rate of primary education, and the country-level model analyzes the effect of school completion on GDP growth.

2.1 Household-based Analysis

2.1.1 Discussion on Model

Sengupta and Guha (2002) studied household factors affecting schooling choice for girls. They assumed that the probability of child's school participation as predicted from a series of demographic, regional household and parental characteristics and developed an analytical model.

The model they used in the study is developed to analyze the impact of household demand factors on the school participation and performance in four villages and two urban wards of West Bengal. The model is following:

$$P_h = \beta_1 + \beta_2 \text{daded}_h + \beta_3 \text{momed}_h + \beta_4 \text{occup}_h + \beta_5 \text{inco}_h + \beta_6 \text{momoc}_h + \beta_7 \text{youngsisb}_h + \beta_8 \text{age}_h + \beta_9 \text{wk}_h + \beta_{10} \text{relgn}_h + \beta_{11} \text{caste}_h + \beta_{12} \text{regn}_h \cdots (1)$$

Where, dependent variable P_h is dropout rate of the household h and the explanatory variables are: level of education of the father or the household head *daded*; level of education of the mother or the wife of the male household head *momed*; occupation of the father or the male household head *occup*; family income *inco*; mother's work status *momoc*; presence of siblings in the household under the age of seven years *youngsisb*; age of the girl child *age*; work status of the girl child *wk*; family's religion *relgn*; family's caste *caste*; and family's rural/urban residence *regn*. The data was taken from four villages and two urban wards of West Bengal, India. The sample consisted of six hundred households, a hundred households selected from each six regions.

The results of their study showed that among all tested variables, parental education had the strongest positive influence on girls' school enrolment chances, the impact of mother's education being the stronger of the two. Either parent's schooling beyond the eighth grade ensured girls' primary and secondary schooling raised daughters' enrolment chances significantly. With regard to occupational categories, the result must be interpreted in terms of the most of data collected from

cooperative farms, which was the most prevalent, and therefore, the omitted group in the regression. It was observed that enrolment chances were the highest for girls whose fathers were employed in white-collar occupations and the lowest for girls belonging to families of agricultural laborers. Household income had a significantly positive on girls' enrolment, as the authors had expected. In their study, mothers' work participation⁴⁾ had a significantly negative effect on daughters' school enrolment. In regard of dropout, their study showed being Muslim, significantly raised dropout levels, the effect being the strongest in models including household income and occupation. Mother's labor force participation did not have a significant impact on the probability of dropout.

2.1.2 Model in this Study

To determine the effect of early childhood development program, we developed a model based on the equation (1), which is developed by Sengupta and Guha (2002). Besides, we removed six variables as the data reflecting students and their parents' characteristic were not available from national census of India. Although we could not assess micro-level data, we collected household-based data for whole Indian states and we add four new variables reflecting ECD and religious effect; these data and variables would lead more generalized result of ECD impact on primary education. This model analyses the effect of early childhood development on dropout rate of primary education. The explained variable for this household-based model is the dropout rate of primary school and explanatory variables are the following factors:

$$Ps = \alpha + \beta_1 HHSIZES + \beta_2 MHHEs + \delta_1 FGEDs + \delta_2 MGEDs + ECYs + HNDs + CRSTs + MSLMs \dots (2)$$

The explained variable is dropout rate of primary school in state s of

⁴⁾ In Sengupta and Guha (2002), the word 'work' was defined as any income-earning activity for which the mother was individually paid. Women's work in family owned fields and household enterprises earned no independent income. Such work participation was not reported as 'work' during their study.

India in year 2010: *P* and explanatory are averaged household size of students: *HHSIZE*, averaged proportion of monthly expenditure on education of household: *MHHE*, level of father's education represented by percentage of population which fathers with secondary or higher education completion who have primary school-aged children to population of fathers with primary education completion or no education: *FGED*, level of mother's education represented by population of mothers with secondary or higher education completion who have primary school-aged children to population of mothers with primary education completion or no education: *MGED*. As this paper aims to analyze the effect of ECD, we added enrolment rate of formal pre-primary school/program: *ECY* as explanatory. Furthermore, we added the three religious factors on the schooling choices. Three major religions: Hindu, Christian and Muslim are popular in India; accordingly we added percentage of households with primary school-aged children which have faith in each three religions to all households with same age group children: *HND*, *CRST* and *MSLM* denote each religious population. Given the 0-1 nature of the dependent variable dropout of school, a maximum likelihood logit estimation model was used to analyze enrolment and dropout decisions, because linear regression in such cases would have yielded inefficient results. The data for analysis is based on the national survey by the Ministry of Human Resource Development, India.⁵⁾ The estimate model utilized logistic model and stepwise method.

⁵⁾ District Information System for Education (DISE) was released during the middle of 1995. It is a statistical system developed for collection, computerization, analysis and use of educational and allied data for planning, management, monitoring and feedback. DISE is an initiative of the Department of Educational Management Information System of NUEPA for developing and strengthening the educational management information system in India. The initiative is coordinated from district level to state and extended up to national level are being constantly collected and disseminated. It provides information on vital parameters relating to students, teachers and infrastructure at all levels of education in India.

Table 1 Descriptive Statistics of Household-based Model

	Mean	Median	Std. Deviation
Primary school dropout rate in %	0.1017	0.075	0.0143
Household size	9.7963	7.4	7.4395
Monthly household expenditure in %	16.3623	16.1	3.1550
Population of Fathers with education in %	83.8319	82.67	6.2457
Population of Mothers with education in %	68.9559	70.7	10.0664
Participation rate of ECD program in %	13.6444	11.3	11.1020
Proportion of Hindu households in %	67.3411	80.61	28.8432
Proportion of Christian households in %	10.1444	1.55	21.5578
Proportion of Muslim households in %	14.3167	8.47	20.9766

2.2 Country-level Analysis

2.2.1 Discussion on Model

Khiliji et al. (2011) aimed to explain economic growth by education expenditure of the government, labor force participation and capital formation. The model that they used to analyze in the study is based on the aggregate production function. Y is output, A is technological progress, K is capital stock, L is labor force, and H is used for high-skilled labor. Human capital can be decomposed into two factors; labor force and level of education.

$$Y = A.K^{\alpha}.L^{\beta}.H^{\gamma} \dots (3)$$

According to Khiliji et al. (2011), it can be defined as total market value of all the goods and services produced in a country during one financial year. Gross fixed capital formation is used as a measure of capital stock. Gross fixed capital formation is a macroeconomic concept used as measure of the net investment in an economy in ‘fixed capital assets’ during one financial year. Labor force is considered as the number of skilled workers willing to work. Labor force is one key factor in economic development of labor intensive countries. In the model, labor force participation rate is used as proxy for labor. Generally, human capital refers

to ‘skilled and efficient and productive labor force’. Human capital is based upon two main factors: education and health. In their study, they aimed to determine the impact of education on economic growth; therefore they have used the government education expenditure as a percentage of GDP as measure of human capital.

$$\ln Y = \alpha + \beta_1 \ln (EDUEXP) + \beta_2 \ln (LFPR) + \beta_3 \ln (GFCF) + \mu \dots (4)$$

\ln represents natural logarithm; Y is placed at left side as GDP growth rate of the country. Independent variables are $EDUEXP$ as government expenditure on education as percentage of GDP; $LFPR$ as labor force participation rate aged 15-24 years; $GFCF$ as gross fixed capital formation and μ as an error correction term.

2.2.2 Model in this Study

To determine the effect of dropout of school on economic growth, we developed a model based on the formula (4). Since we would like to analyze the impact of dropout and progression to secondary education, we added two indicators, dropout rate of primary schools and progression rate to secondary education as explanatory variables to the formula (4). The explained variable for country-level model is the GDP growth and explanatory variables are GDP growth, which is explained by the following formula containing five factors. We added two ECD-related factors; if these two variables proved statistically significant, the result means that ECD could have effect on economic development.

$$\ln Y_{it} = \alpha + \beta_1 \ln(EDUEX_{i-10}) + \beta_2 \ln(LFPR_{it}) + \beta_3 \ln(IVST_{it}) + \ln(COMP_{it}) + \ln(PROG_{it}) \dots (5)$$

We denote the sample country by i and year t . $EDUEX$ is amount of government expenditure as stock of last 10 years, and $IVST$ is amount of gross new investment of last 5 years which is substituted for variable of gross capital stock. We added two independent variables; complementation rate of primary school in grade V: $COMP$, progression rate from primary school to secondary $PROG$. As we

would like to assess the impact of completion of primary education and progression to secondary education, we added two factors; completion rate of primary school and progression rate to secondary school as explanatory variables. The completion rate is measured as gross intake rate to the last grade of primary. In addition, the progression rate is defined as transition from primary (ISCED⁶⁾ 1) to secondary (ISCED 2). The number of new pupil entrants to the first grade of secondary education in a given year, expressed as a percentage of the number of pupils enrolled in the final grade of primary education in the previous year.

If it is proved that completion of school and progression to secondary education has the positive effect to GDP growth, we can express that ECD has positive effect on economic growth in the sample countries. The model has utilized the panel data which is consisted of six South Asian countries: Bangladesh, India, Iran, Nepal, Pakistan and Sri Lanka in 15 years from 1998 to 2012. Thus, the panel data is composed from total 90 observations. We collect data from the World Development Indicators of World Bank. Regarding analysis method, we apply one-way fixed effect estimation by controlling sample characteristics and clarify how

Table 2 Descriptive Statistics of Country-level Model

Variables	Mean	Std. Deviation	Median
GDP in current in USD	25.1353	1.5432	25.0632
Gross new investment in USD	21.2953	0.3287	20.7249
Labor force participation rate in %	3.8791	0.0303	3.8111
Government education expenditure in %	20.9098	0.1692	20.8220
School completion rate of grade V in %	4.3950	0.0211	4.4000
Progression rate to secondary school in %	4.0053	0.0423	3.9442

⁶⁾ The International Standard Classification of Education, abbreviated as ISCED, is an instrument for compiling internationally comparable education statistics. The ISCED 97 version covers two classification variables: levels and fields of education as well as general, vocational, prevocational orientation and educational/labor market destination. ISCED 1 is defined as it begins between five and seven years of age, is the start of compulsory education where it exists and generally covers six years of full-time schooling, and ISCED2 continues the basic programs of the primary level, although teaching is typically more subject-focused. Usually, the end of this level coincides with the end of compulsory education.

school completion and secondary progression affect economic growth. The STATA software is used to estimation of this analysis model.

3 Empirical Results

3.1 Result of Household-based Analysis

Our empirical results are presented in Table 3. Stepwise multiple regression showed that the best variable combination and removed two variables: proportion of Muslim households and proportion of household expenditure on education. The results show that participation of ECD program had a strongly significant and negative impact on school dropout on primary education. The result confirms that ECD could reduce dropout of primary education as we hypothesized. Proportion of educated father also appeared weak but significant negative impact; educated father could reduce their children’s school dropout.

Enrolment in ECD program reduces dropout on primary education by 0.46%. Household size and rate of Christian/Hindu households have positive

Table 3 Statistics of Regressions of Household-based Analysis

Estimation method	Logistic model	
Constant term	12.14085	
Partial regression coefficient		Standard error
Household size	7.9287*	2.6574
Population of fathers with education	-0.8763*	0.5027
Population of mothers with education	0.3783	0.3760
Participation rate of ECD program	-0.4596**	0.1517
Proportion of Hindu households	0.1020*	0.0843
Proportion of Christian households	0.2484**	0.0784
R-square	0.6046	
Adjusted R-square	0.4859	
F-statistic	5.10	
Number of observation	27	

Note: * and ** represent *P*-value under 0.05 and under 0.01 respectively.

effect on dropout: large household size could increase dropout by 7.94%, Christian household increases by 0.26% and Hindu household increase by 0.10% respectively. These results lead to our presumption that households with much brothers or sisters have trend towards taking preference of male children in schooling choice. The positive effect of Christian population to dropout might imply effect of missionary schools which run by Christian NGOs. On the other hand, mothers' education could not show significant effect; however, most of studies female education or related indicators have strong relation with school activity.

3.2 Result of Country-level Analysis

Table 4 shows the result of country-level fixed-effect model. Hausman test was applied for model specification and the result indicated that fixed-effect model is appropriate. The table shows the estimated coefficients of respective variables. Gross investment amount indicates statistically significant and positive effect on GDP: investment could increase GDP by 0.18%. Labor force participation of aged 15-24 showed strongly significant and negative impact on GDP: young, low skilled labor force could reduce GDP by 2.42%. Government expenditure appeared significantly positive but weak relationship with GDP: government expenditure would increase GDP by 0.24%. Progression rate also appears significant positive impact on GDP: it means that students' progression to secondary school could increase GDP by 1.30%. However, primary school completion appeared statistically significant and the coefficient was negative. This finding may be caused by the data selection; most of sample countries are developing countries not least developing countries, primary education is not sufficient for development. These results confirmed our hypothesis that ECD could enhance economic growth through reducing dropout and secondary progression.

We hypothesized that labor force participation of aged 15-24 would have negative relationship with GDP. Young population who are out of secondary and tertiary education would have constrained sustainable economic growth with higher human capital accumulation. As expected, the coefficient of labor force participation rate showed strongly negative. Also, stock of education expenditure by country's

government is statistically significant and coefficient is positive we assumed that government expenditure on education could have been positive impact on economic growth of the country as the governments disburse their budgets aiming increase higher human capital. This result is consistent with other literatures analyzing relationship with education and public budget.

Table 4 Statistics of Regressions in Country-level Analysis

Estimation method	One-way Fixed effect model	
Constant term	22.7878	
Partial regression coefficient		Standard error
Gross new investment	0.1799**	0.0301
Labor force participation aged 15-24	-2.4214**	0.5035
Government education expenditure	0.2350*	0.1100
School completion rate of grade V	-0.5011	0.4297
Progression rate to secondary school	1.2977**	0.3479
R-squared	0.8009	
F-statistic	63.56	
Prob. (Hausman test)	0.0000	
Number of observation	90	

Note: * and ** represent *P*-value under 0.05 and under 0.01 respectively.

4 Concluding Remarks

This paper has focused on how early childhood development (ECD) has impact on economic growth in developing countries in South Asia. With empirical results from household-based model, it suggests that ECD participation reduces dropout of primary education. Based on the result of country-level analysis, it is reasonable to suppose that the relationship between economic growth and secondary progression is clearly proved with panel data. The result of two analysis models can confirm our hypothesis that early childhood development program could enhance economic growth by reducing dropout of primary education, improve education completion, and increase human capital of laboring population by encouraging secondary school

progression.

In this paper, we did not discuss about quality of education. We treated output of ECD program and primary education as standardized quality, though quality of ECD is marginalized amongst the countries (UNESCO, 2007). Therefore, quality of education is essential for the economic growth and human capital of the developing countries, the government with competent administration at the lower level, should increase the expenditure on education sector to promote research, development activities and improve the quality.

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