GRADUATE SCHOOL OF TOKYO UNIVERSITY OF FOREIGN STUDIES

The Effect of Early Childhood Development in South-west Asia

From Macro- and Micro-level Analysis

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2013/12/20

This paper aims to analyze the relationship between economic growth and early childhood development in south west Asia. 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. This article analyses the impact of early childhood development in drop-out rate and GDP growth in macro- and micro-level.

Abbreviations and Acronyms

ECCE: Early Childhood Care and Education

ECD: Early Childhood Development

ECE: Early Childhood Education

EFA: Education for All

GER: Gross Enrolment Rate

NER: Net Enrolment Rate

ADF test: Augmented Dickey-Fuller unit root test

Table of Contents

Index of Tables

1 Introduction

This paper aims to analyze the relationship between economic growth and early childhood development in south west 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 dropout from 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.

Education is very important factor of human capital formation. It pays fundamental part in developing human capital and accelerates economic growth by improving skills, competency and productivity.[1] The education brings benefits for the whole society and the individuals. For developing countries like Pakistan, education plays a key role in poverty reduction, and removing both social and income inequalities. Developing countries are trying to improve access/ intake to schools followed by education for all (EFA) movement. However, drop-out from schools is severe in primary schools; especially in the first grade and the final grade. If it continues trying to increase intake of schools, the drop-outs will also increase. Increase in dropped out student would damage economic growth of the country. In this paper, we would like to insist that early childhood development (ECD) or pre-primary schooling can reduce drop-out and positive impact on economic development. This paper mainly aims to analyze the relationship between early childhood development or early childhood care and education (ECCE) and economic growth in south Asian countries. We have analyzed the factors that contribute to economic growth from long time series and short time series.

According to EFA Global Monitoring Report 2008, Out of 129 countries, 51 have achieved or are close to achieving the four most quantifiable EFA goals (universal primary education, adult literacy, gender and quality of education), 53 are in an intermediate position and 25 are far from achieving EFA as a whole, the EFA Development Index shows. The lowest category would be larger still if data were available for a number of fragile states, including conflict or post-conflict countries with very low levels of education development. As concerns early childhood care and education, the report pointed out:

[1] Khiliji, Khan & Kakar (2011)

- 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 3 and above has improved but remains scarce across sub-Saharan Africa and the Arab states.
- Early childhood care and education 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.

Also, regards on universal primary education:

- Twenty- three countries that lacked legal provisions for compulsory education in 200 have since established them. Compulsory education laws now exist in 95% if 203 countries and territories.
- The global net enrolment ratio rose from 83% to 87% between 1999 and 2005, faster than from 1991 to 1999. Participation levels increased most rapidly in sub-Saharan Africa (23%), and South and West Asia (11%).
- The number of out-of-school children dropped by 24 million to 72 million between 1999 and 2005. Thirty-five fragile states account for 37% of all out-of-school children.
- Despite overall enrolment increases, subnational disparities in school participation persist between regions, provinces or states and between urban and rural areas. Children from poor, indigenous and disabled pupations are also at a systematic disadvantage, as are those living in slums.
- On current trends, fifty-eight out of eighty-six countries that have not yet reached universal primary enrolment will not achieve it by 2015.

1.1 Words Definitions

To be clear with the terms used in this paper, here some important words in this paper are defined.

- Primary/elementary Education

Primary education is a part of elementary education system of India. Elementary education consists of eight grades and the primary level is from first to fifth grade.

The term ‘elementary education’ was less ambiguous as it was 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 was broadly accepted as primary schooling aiming to provide for more than just the simple acquisition of literacy and numeracy. The implementation of free and compulsory education was not perceived at the time as particularly difficult to implement if political will could be secured. In the about 50 Member states of the UN 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, a common acceptance was that schooling could not be made compulsory unless it was available and free of costs for the learner. Although the World Education Report 2000 cautions that, as used in the Universal Declaration of Human Rights;

> *‘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.*”

It also acknowledges that the concept of ‘*elementary education’ itself was broadly understood in most countries to mean primary schooling.* In this sense it can be related to ‘basic education’. Although there seemed to be a great difference regarding the duration and the content of elementary education among countries, its overall aim was to go beyond the simple acquisition of literacy and numeracy skills. As back as 1961, the World Survey of Education by UNESCO, refers to the increasing acceptance of an “integral view of education which leads to the abolition of the former sharper distinctions”. Thus, ‘primary schooling’ and ‘secondary schooling’ were more and more regarded as “successive phases of a continuing process that cannot be sharply distinguished except arbitrarily and by doing violence to the real continuity of growth and education”. The expansion of education in the decades that followed was not accompanied by similar expected achievements in learning outcomes. Lack of qualified teachers, books and other learning materials seriously compromised the quality of education provided. Thus the concern moved from ‘schooling’ to a ‘learning-centered’ notion of education. By 1970s this notion has moved towards the fulfillment of what came to be called

'basic learning needs'. The term of 'basic learning needs' was preferred to the rather controversial concept of 'minimum essential learning needs' proposed by the International Council for Educational Development (ICED) in 1973. This idea of limiting learning needs to a 'minimum' to be met with a 'minimum package' of knowledge and skills seemed to imply a limitation to the right to education. Until the 1980s, the term was internationally preferred and was adopted by the World Conference on Education for all in 1990 together with basic education that aimed to meet these basic learning needs. Since then, as the World Education Report 2000 reports, the notion of 'basic education' was generally understood to 'overlap' with the earlier notions of 'fundamental' and 'elementary education' as used in the Universal Declaration of Human Rights. But the report argues that;

> *"There does not exist an internationally agreed text that actually says so. In so far as there is such an overlap, it can plausibly be argued that the spirit of the Declaration requires that basic education too 'shall be free', just like 'elementary and fundamental education'."*

The argument made is that the Declaration does not refer to the term 'elementary' per se but to the kind of education that reflects the notion of 'basic leaning needs' and that these needs change over time. This is firstly acknowledged in the Framework for action of the World Conference on Education, in 1990. More specifically goal 2 of the Millennium Development Goals:

> *"Universal access to, and completion of, primary education (or whatever higher level of education is considered as "basic") by the year 2000"…. Therefore, instead of accepting 'elementary education' as a complete level of education in itself, it began to be considered as the first (or 'basic') phase of a continuous learning process.*

At the same time, by acknowledging 'basic learning needs' and the obligation through the right to education that these needs are met for everyone, it naturally gives rise to the question of identifying these needs, in terms of decision makers, content and learners.

- Early Childhood Care and Education

Early childhood is defined as the period from birth to 8 years old. A time of remarkable brain development, these years lay the foundation for subsequent learning. UNESCO advocates for Early Childhood Education and Care (ECCE) programs that attend to health, nutrition, security

and learning and which 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: 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 latter 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 report also uses the term "pre-primary" education in line with UNESCO usage. 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. They are most likely to be private. Pre-primary education programs are primarily designed for children aged 3–6 years as an introduction to a school-type environment, to provide a bridge between home and school and are variously referred to as infant, nursery or preschool education (the most commonly used term by countries), kindergarten or early childhood education but other terms include children centers, preparatory education and initial education. Arising out of the World Education Forum held at Dakar in 2000, the term "other ECCE programs" has been used to refer to non-formal development programs designed for children from age 3 that include organized learning activities spanning, on average, two hours per day and 100 days per year. ECE therefore represents a continuum of interconnected arrangements provided by a mix of actors: governments, NGOs, private providers, communities and parents. The settings can encompass center-based programs to classes in schools. Such a diverse sector is also reflected in the terms used to describe the workforce. Early childhood teachers, pedagogues, nursery workers, child minders, day-care staff, auxiliary nurses, volunteer helpers are just some of the titles to describe the workforce found in early childhood programs and institutions. Relatively

little is known about the staff working with the very youngest children (under 3 years), especially in developing countries. Parents (typically mothers) and community members are an important feature of early childhood programs, especially in developing countries and rural areas. Many NGOs run programs to help parents accomplish their role as first educator effectively. In the report, the terms "teacher" or "teaching staff" are mostly used to describe the teaching workforce in mostly formal ECE. In addition to the teaching staff, some countries have teaching assistants, cooks, nurses, psychologists and other specialists and support staff working in early years' education. In about 85 percent of countries, participation in pre-primary education is not compulsory.[2] The standard age range for this sector is 3-5 year-olds. There is a trend towards counties making pre-primary education compulsory. This duration is much shorter- one or two years in much of Latin America and the Caribbean, the Arab States, East Asia and the Pacific. Inevitably, understandings of, approaches to, early childhood vary according to changing local traditions, cultures, family structures and the organization of primary schooling. The report implicitly acknowledges the importance of, for example, changing household and family structures, as well as valuing this diversity in an increasingly multicultural world.

- Literacy

Literacy, as defined in the Census of India operation, is the ability to read and write with understanding in any language. A person who can merely read but cannot write is not classified as literate. Any formal education or minimum educational standard is not necessary to be considered literate. Adopting these definitions, the literacy level of the country as a whole was only 29.45 percent, with male literacy at 39.45 percent and female literacy at 18.69 percent.

According to Education for All Global Monitoring Report 2006, most of its history in English, the word 'literate' meant to be 'familiar with literature' or, more generally, 'well educated, learned'. Only since the late nineteenth century has it also come to refer to the abilities to read and write text, while maintaining its broader meaning of being knowledgeable or educated in a particular field or fields'. Thus, the original meaning of the English word 'literacy' is different from its translations in several other languages. Since the mid-twentieth century, scholars have devoted considerable attention to defining literacy, and their work has

[2] UNESCO (2007)

had direct implications for approaches to practice and policy. Academics from such wide-ranging disciplines as psychology, economics, linguistics, sociology, anthropology, philosophy and history have engaged in an ongoing and, at times, highly contested debate over the meaning and definition of the term 'literacy' and how it is related to the broader notions of education and knowledge. Taking into account these evolving debates, including the major traditions, critiques and approaches to literacy, this section presents four discrete understandings of literacy:

- Literacy as autonomous set of skills
- Literacy as applied, practiced and situated
- Literacy as text

Numeracy and the competencies it comprises is usually understood either as a supplement to the set of skills encompassed by 'literacy' or as a component of literacy itself. A recent research review notes that the English term 'numeracy' was first coined in 1959 in the Crowther report submitted to the United Kingdom's Ministry of Education[3], as Coben (2003) finds the 'mirror image of literacy', to refer to a relatively sophisticated level of what we now call 'scientific literacy'. Numeracy is most often assumed to depend upon a solid mathematical education and innumeracy to be the result of poor schooling. This 'limited proficiency' conception of numeracy, which emphasizes equipping the workforce with minimum skills, continues to dominate and has been adopted by many national and international assessment agencies. Challengers to this view note that the competence-based agenda for adult mathematics/numeracy education is dangerously limited[4]. They distinguish between concepts of numeracy with narrowly defined learning outcomes, which they characterize as approaching numeracy from a human resources perspective, and approaches that would allow for the development of critical citizenship[5]. More recently, 'numeracy' has been used to refer to the ability to process, interpret and communicate numerical, quantitative, spatial, statistical and even mathematical information in ways that are appropriate for a variety of contexts. The term

[3] Central Advisory Council for Education (England), 1959

[4] Fitzsimons (2002), cited in Coben et al., (2003)

[5] Johnston et al., (2002), cited in Coben et al., (2003)

increasingly refers to a competence allowing more effective participation in relevant social activities.

The word 'literacy' has begun to be used in a much broader, metaphorical sense, to refer to other skills and competencies, for example 'information literacy', 'visual literacy', 'media literacy' and 'scientific literacy'. International organizations notably the OECD through publications such as Literacy in the Information Age (2000) and Literacy Skills for the Knowledge Society (1997) have given impetus to the use of such terms, eventually giving rise to a new French term, littératie[6]. The meaning of these concepts tends to be diverse and shifting, ranging from the view of literacy as a set of largely technical skills (the OECD perspective) to the idea that these skills should be applied in critical ways to examine one's surroundings (e.g. the workplace and the media) and push for social change[7]. For instance, 'information literacy' broadly refers to the ability to access and use a variety of information sources to solve an information need. Yet, it can also be defined as the development of a complex set of critical skills that allow people to express, explore, question, communicate and understand the flow of ideas among individuals and groups in quickly changing technological environments. Some scholars have suggested that a more useful concept would be that of multiple literacies that is, ways of 'reading the world' in specific words, but also the interpreting of signs, symbols, pictures and sounds, which vary by social context[8]. In short, different everyday contexts present different literacy demands, perceptions of literacy, and types of power relations and hierarchies of knowledge[9] contexts: technological, health, information, media, visual, scientific, and so on (see Street, 2003; Lankshear and Knobel, 2003; Cope and Kalantzis, 2000). This concept has recently been adopted in the francophone world (most prominently, in Quebec) through the term littératies and has been used to understand the multiple forms of literacy among minority communities with shifting cultural identities (see the work cited in Fernandez, 2005). Yet the notion of multiple literacies is not without controversy. By attracting a long list of modifiers, 'literacy' has become a debased term, its core reference to reading skills undermined (Jones, 1997; Hull, 2003). Some respond to this critique by

[6] Fernandez (2005)

[7] Hull (2003)

[8] Cope, Kalantzis (2000)

[9] Barton, Hamilton & Ivanic (1999)

emphasizing that reading, in the broadest sense of the word, remains integral to the notion of literacy. Thus, reading may mean not only the decoding and understanding of words, but also the interpreting of signs, symbols, pictures and sounds, which vary by social context10. In short, different everyday contexts present different literacy demands, perceptions of literacy, and types of power relations and hierarchies of knowledge[11].

1.2 Literature review

The history of humans from the earliest time to the present has been a history of struggle against the environment and human competitors to improve the vitality, safety, security, and comfort of the individual and his/her clan. Modern nation states continue the effort to provide their citizens with human welfare (Olsen 1978). Thus, the relative success of nations in achieving human welfare should be the basis for defining a development-underdevelopment continuum. From the Universal Declaration of Human Rights to the Helsinki Agreements, many statements have been made by individual world leaders and by international organizations about human rights and their universality.[12] By participation in the United Nations and acceptance of its Charter, the world's nations have endorsed the concept of human rights and pledged themselves to improve the welfare of their citizens. De Souza and Poter (1974) established the concept of the inherent dignity of the human person, development goals can be summarized as (1) life-sustenance, (2) esteem, and (3) freedom. Because nations attempt to organize human and physical resources to create a viable state, human welfare can be conceived as the outputs of the basic national macro-systems.[13] The problem of evaluating nations in terms of their ability to provide human welfare fits perfectly within the rubric of regional geography.[14] Regional geography seeks comprehensive knowledge about places within the

[10] Cope, Kalantzis (2000)

[11] Barton, Hamilton & Ivanic (1999) Street (2003)

[12] Maslow (1970) De Souza, Porter (1974) Adler-Karlsson, Wriggins (1978)

[13] Morris (1979) Bailey (1982) Smith (1973)

[14] Greer-wootten (1972) Guelke (1977)

context of a specific problem. It is obvious that "comprehensive knowledge" is literally an impossible goal, but we must make some reasonable attempt to approach it. Given the problem of assessing levels of human welfare, comprehensive knowledge can be sought by evaluating the operations of a nation's physical, social, economic, and political systems. Together, these systems comprise the human and physical resources with which leaders can build a coherent nation and society. We must focus on sub-systems that promote human welfare and those that detract from human welfare (dysfunction). Equally important, we must make an attempt to understand the complex problem of the interrelationships among subsystems.[15] Thus we will use a systems analysis schema at the national scale to explore questions about systems goals, systems outputs, positive/negative feedback, steady-state or equilibrium of systems, and interrelationships among subsystems which ultimately promote or reduce national viability.[16]

The Education for All (EFA) movement is a global commitment to provide quality basic education for all children, youth and adults. At the World Education Forum (Dakar, 2000), 164 governments pledged to achieve EFA and identified six goals to be met by 2015. Governments, development agencies, civil society and the private sector are working together to reach the EFA goals. The Dakar Framework for Action mandated UNESCO to coordinate these partners, in cooperation with the four other conveners of the Dakar Forum (UNDP, UNFPA, UNICEF and the World Bank). As the leading agency, UNESCO focuses its activities on five key areas: policy dialogue, monitoring, advocacy, mobilization of funding, and capacity development.

According to the World Development Report 1993, the global burden of disease amounts to 1.21 billion. Developing countries account for 90% of the global burden of disease and a significant portion of that burden comes from conditions such as respiratory infections, water-borne diseases or tuberculosis that primarily occur in those countries. Developing efforts of these economies, therefore, needs to pay close attention to the relationship between the health status of the population and economic development. At the macro level, some studies did look

[15] Langton (1972) Jarvie (1973) Bailey (1982)

[16] Boulding (1956) Foote, Greer-Wootten (1968) Kellerman (1987) Miller (1965)

into the largely ignored relationship between health (another component of human capital) and economic development. Using a simultaneous equation model, Wheeler (1980) showed a strong association between health status and the growth rate of the gross domestic product (GDP) of developing countries. The World Development Report 1993 found that health status is a highly significant predictor of economic performance. Their results are based on an analysis that examines the relationship of growth in income per capita between 1960 and 1990 in about seventy countries to the initial level of national income, the initial education level and an indicator for health status. Strauss and Thomas, using height and the body mass index as a measure of health status, have shown that in low-income economies health status may be a very important determinant of income, especially in manual jobs requiring more strength.[17] Sachs and Warner (1997) also points out that tropical countries grew 1.3 percentage pointed more slowly each year than those in temperate zones during the period 1965-1990, which appears to reflect the cost of poor health and unproductive farming. In recent years, McCarthy, Wolf and Wu examined the relationship between higher malaria morbidity and the growth rate of GDP per capita in Sub-Saharan Africa.[18] They found a quite robust negative impact of malaria on GDP growth rate. Wang (1999) shows that six different indices (health status indicators) of health are correlated with income per capita of 115 developing countries.

Micro level studies have focused on the impact of health status and a particular disease on labor productivity. Using panel data from rural India, Deolalikar found a highly elastic market wage rate with respect to height for weight.[19] Strauss found a highly significant positive effect of caloric intake on labor productivity in Sierra Leone.[20] However, Baldwin, Weisbord and Helminiak reported that parasitic infection had no significant adverse effect on the productivity of agricultural workers in Saint Luci.[21] Kim *et al.* found that relatively older permanent male employees had the largest Onchocercal Skin Disease (OSD)-related loss in

[17] Strauss, Thomas, *Health, Nutrition, and Economic Development*, 1998

[18] McCarthy, Wolf & Wu (1999)

[19] Deolalikar (1988)

[20] Strauss, *Does Better Nutrition Raise Farm Productivity?*, 1986

[21] Weisbrod, Helminiak (1977)

productivity in terms of diminished earnings and an adversely impacted labor supply in south west Ethiopia.[22]

The synthesis framework, developed by Easterlin (1978), with modifications to incorporate proximate factors identified by Bongaarts[23] and intervening variables between modernization and fertility[24], is to explain the causal links between female education and actual fertility (number of live births). Actual fertility is seen as determined by use of contraception, fecundity, and age at marriage. The use of contraception is seen as determined by demand or desire for children and costs associated with the use of contraception. Education is seen to affect fertility by influencing the family size desire, costs associated with contraception, fecundity (physiological capacity to reproduce), and age at marriage. We shall review here the relationship between education and fertility generated through variables that are most relevant to these four intervening factors in the Indian context. Review of relevant literatures suggests that a shift from large to small number of children occurs along with (a) decline in labor value of children, (b) decline in children's value as old-age security, (c) increase in economic costs of raising children, and (d) decline in infant and child mortality. Some empirical findings regarding each of these four associations and the effect of education on the above variables are discussed below. 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.[25] The next important reason for a decrease in family size-desire in the same village is the actual as well as perceived decline in the old-age security value of children. In this Pakistani village as well as in nine villages in the state Karnataka in India studied by Caldwell *et al*[26],

[22] Kim, Tandon & Ruiz-Tiben (1997)

[23] Bongaarts (1978)

[24] Nag, *The equity-fertility hypothesis as an explanation of the fertility differential between Kerala and West Bengal*, 1983

[25] Nag, Kak, *Demographic Transition in a Punjab Village*, 1984

[26] Caldwell, Reddy & Cadwell (1982)

higher aspiration of parents for their children's education (as result of increase in non-agricultural job opportunities) is an important factor for the decrease in labor value and old age security value of children. The financial burden of direct costs (*e.g.* education, food and clothing) 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.[27] Educated parents are expected to be motivated more than the uneducated ones for the actual and perceived costs of their children. For example, in urban part of India the increasing aspirations of middle class parents for education of their children in private schools and colleges and rapidly rising costs in these institutions relative to their income are primary reasons for their motivation towards families with small household size.

Until recently, Vietnam is likely to have achieved universal primary education. However, due to a rapid increase in the number of enrolled students, development communities and policy circles in Vietnam have great concerns regarding the quality of education in the country. At the same time, considerable attention has been given to understand what kind of school inputs can effectively improve students' achievement. Ogawa and Nakamuro (2009) aimed to empirically examine the relationship between school inputs and students' achievement in Vietnam using the education production function approach.[28] The data for the study were collected by the World Bank and General Statistics Office of Vietnam as the Vietnam Living Standard Survey of the Vietnamese government. The study found that in primary education, infrastructure variables (*e.g.* electricity, water resources, and sanitary toilet) are positively correlated to students' achievement measured by test scores from the national graduation exams. In addition, teacher variables (*e.g.* teachers who have more than ten years of experience) and expenditure variables (*e.g.* construction funds provided by parents of students and communities wherein students have lived) are also statistically significant to improving students' achievement. At the secondary level, although infrastructure variables are not found to be statistically significant, many teacher and expenditure variables are statistically significant. A cost-effectiveness analysis using the parameters estimated by the education production function was also conducted in this study. Their findings confirmed that the marginal rates of return are

[27] Arnold, et al., (1975)

[28] Ogawa, Nakamuro (2009)

not equalized across inputs and resource allocation at the school level in Vietnam is not optimized. Teacher variables are less cost effective than other input variables, such as infrastructure and expenditure for all levels of education.

Azarnert studied the relationship between fertility, education (by genders and levels)[29], women's participation rate in labor market, urbanization, infant mortality and relative cohort size is investigated in the 14 Middle Eastern countries for the period of 1980 and 1998. Pooled cross-sectional time series GLS model is applied. Results indicate that education of females in secondary and primary levels, female labor participation and urbanization are negatively associated and significant with fertility and tertiary education is negatively correlated but not significant. On the other hand, male education in primary and secondary education and infant mortality are positively associated with fertility. Two conclusions can be drawn. The first is that even though a region where traditional values are overwhelming in the society, enhancing female status may change fertility decisions. The second is that better health care may not be sufficient to lower fertility but a broad range of family planning should backup health care to accomplish low fertility rate. In this research, it is also considered the relative income theory. An evidence to support the relative income hypothesis cannot be found for the Middle Eastern region. This may reflect that these countries are still in the transition stage in terms of demographical dynamics or younger generation gives higher priority to having children so that the desired number of children overcomes the fierceness of the competitive labor market.

Dreher and Walter analyzed the effect of IMF involvement on the risk of entering a currency crisis and respectively.[30] Their study is not an evaluation of IMF-supported programs. It focused on the narrower question of whether increasing government education expenditure can improve economic growth in the case of Uganda. Accordingly, the objective of the study is to analyze the impact of education expenditures per worker on economic growth in the country using time-series analysis. In general, there is analytical reason to believe that it does. Expenditures on education can be interpreted as investments in human capital. On the empirical

[29] Azarnert (2006)

[30] Dreher, Walter (2010)

front, however, there is disagreement among researchers as to whether education expenditures are productive and therefore associated with higher per capita real GDP growth. Some researchers find evidence that education or education expenditures have direct or indirect positive effect on economic growth. Barro finds a positive correlation between education expenditures and economic growth.[31] Gemmell finds both the levels of human capital and their growth rates to be important determinants of economic growth.[32] Benhabib and Spiegel find evidence that education influences the rate of technological progress.[33] Other researchers find either weak or no evidence that education or education expenditures enhance economic growth. Devarajan *et al*. find negative correlations between the share education expenditures in government budget and economic growth in most of their estimates.[34] They attribute the negative impact of education expenditures in some countries on excessive expenditures, rendering them unproductive on the margin. Benhabib and Spiegel find weak evidence of a relationship between changes in educational attainment of the labor force and economic growth.[35] Nonetheless, the weak statistical relationship between education and economic growth can be attributed to measurement errors and influential outliers in the cross-country sample. Most of the studies mentioned above use cross-section analysis. While cross section analysis is informative of the correlation that can be established from the data, it is less useful in establishing a causal link from education or education expenditure to economic growth and, hence, the determinants of economic growth unless convincing instruments can be found. Blis and Klenow found that the causation from schooling to economic growth too weak to produce the correlation coefficients obtained.[36] They discovered reverse the causality from economic growth to schooling, arguing that anticipated economic growth reduces the effective discount rate thus increasing the demand for schooling. They are of the view that the empirical evidence

[31] Barro (1991)

[32] Gemmell (1996)

[33] Benhabib, Spiegel, *The Role of Human Capital in Economic Development*, 1992

[34] Devarajan, Swaroop & Zou (1996)

[35] Benhabib, Spiegel, *The role of human capital in economic development from aggregate cross-country data*, 1994

[36] Bilis, Klenow (2000)

documented by Barro and others does not primarily reflect the impact of education on economic growth but economic growth on education. On the issue of instruments, Rodriguez and Rodrik point out that the instruments normally used are not valid ones.[37]

Prathan[38], the Indian NGO reported that, with more than 93 percent of children ages 6 to 14 years old enrolled in school, India's picture if an "Education for All" was beginning to come into focus in 2005. Billions of dollars had been invested by the federal and state governments to build classrooms, recruit teachers, provide school lunches, and buy books. Now 99 percent of all communities have a primary school located within a one kilometer distance, according to the UNICEF. However, when Prathan, an Indian NGO, conducted its first Annual Status of Education Report (ASER), the picture was less encouraging. Pratham assessed rural schools in 28 of India's 35 states and found[39]:

- 75% of teachers showed up for class,
- 71% of students showed up for class,
- Roughly 80% of schools provided textbooks for most of their students
- Only 15% of grade 2 children and 25% of grade 3 children could read a simple paragraph
- Only 17% of grade 2 children and 32% of grade 3 children could solve a two-digit subtraction problem

Half of the children in rural India are at least three grade levels behind where they need to be, according to ASER 2009. India's Right to Education Act became law in April 2010, mandating free and compulsory education for all children ages 6 to 14 years. However, most Indian children showing up for class are not learning the basic skills, and they are not alone.

[37] Rodriguez, Rodrik (1999)

[38] Pratham is the largest non-governmental organization working to provide quality education to the underprivileged children of India. Pratham was established in 1994 to provide pre-school education to the children in the slums of Mumbai city. Since then, the organization has grown both in scope and geographical coverage.

[39] Pratham (2005)

This problem is widespread among low-income countries. Learning starts with reading, and effective models of teaching reading and supporting literacy in the community have been shown to boost children's reading performance in leaps and bounds.

2 Model & Data

Early childhood development has many effects to individuals and society. According to JICA (2004)[40], we can classify the effects of ECD into roughly two groups, long time-series effects and short time-series effects. The value added of this study are two, deferent time series analysis models. To evaluate the effect of early childhood development in short and long time series, we used two models for analysis. The micro-level model analyses the effect of early childhood development on drop-out rate of primary education, and the macro-level model analyses the effect of drop-out from school on GDP growth.

2.1 Micro-level Analysis

2.1.1 Discussion on Model

Sengupta and Guha (2002) studied household impact on education participation.

The probability of a child's school participation as predicted from a series of demographic, regional and household and parental characteristics. Based on prior research, a positive association between age and schooling was expected. It was also expected that more educated parents would recognize the future benefits of education of their children, and therefore, have a higher propensity to enroll them in school. As proxies for the resources available to the household, we used the variables, father's occupation, monthly family income, whether the mother 'worked and the girl's own labor force participation.

The model Sengupta and Guha (2002) 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, India. The model Sengupta and Guha (2002) developed is following:

$$P_i = F(\beta_1 + \beta_2\, ldaded_i + \beta_3\, lmomed_i + \beta_4\, loccup_i + \beta_5\, linco_i + \beta_6\, lmomoc_i + \beta_7\, lyoungsibi + \beta_8\, age_i + \beta_9\, lwk_i + \beta_{10}\, lrelgn_i + \beta_{11}\, caste_i + \beta_{12}\, lregn_i) \ldots (1)$$

[40] JICA (2004)

Where, dependent variable (P) is dropout rate of schools and the explanatory variables used were: (a) level of education of the father or the household head (Idaded); (b) level of education of the mother or the wife of the male household head (Imomed); (c) occupation of the father or the male household head (Ioccup); (d) family income (Iinco); (e) mother's work status (Imomoc); (f) presence of siblings in the household under the age of 7 years (Iyoungsib); g) age of the girl child (age); (h) work status of the girl child (Iwk); (i) family's religion (Irelgn); (j) family's caste (Icaste); and (k) family's rural/urban residence (Iregn).

The result of Sengupta and Guha (2002) showed that among all the variables tested, 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 middle level schooling raised daughters' enrolment chances significantly. With regard to occupational categories, the result must be interpreted in terms of the group 'farmers', 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 significant positive income on girls' enrolment, as the authors had expected. In their study, mothers' work participation[41] had a significant negative effect on daughters' school enrolment. With regard to school 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. Sengupta and Guha (2002) concluded that;

Income support and income generation programs would be great help. It was observed that low income was a primary reason for low enrolment, high dropout, and low grade attainment. This was particular true of households where the main occupation of the father was agricultural labor. Girls from these households had the lowest school participation and performance levels and undeniably, one of the reasons for this was the extreme poverty that

[41] In Sengupta and Guha (2002), '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.

these families lived in. This sector needs to be feminized and wage levels of agricultural laborer must be restructure-d b y setting and enforcing minimum wage standards, for example. A majority of agricultural laborers owned no land.

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). We added two indicators, enrolment of ECD program and sex ratio of children. Besides, we removed 6 variables (father's occupation, mother's occupation, presence of siblings, age of girl child, work status of children and family's rural/urban residence) as the detailed household data of these variables are not available from national census of India. This model analyses the effect of early childhood development on drop-out rate of primary education. The explained variable for this micro-level model is the drop-out rate of primary school and explanatory variables are the following factors:

$$P = \alpha + \beta_1 HHSIZE + \beta_2 MHHI + \delta_1 FGED + \delta_2 MGED + ECY + CHRST + HND + MSLM \ldots (2)$$

List of Abbreviations:

P… Drop-out rate of primary school

HHSIZE… Household size

MHHI… Monthly household income

FGED... Father's education

MGED… Mother's education

ECY… Participation rate to early childhood development program

CHRST… Rate of Christian population

HND… Rate of Hindu population

MSLM… Rate of Muslim population

The explained variable is drop-out rate and explanatory variables are household size, monthly expenditure on education of household, father's education, mother's education and mother's education level. The variable of Monthly expenditure to education of household

stands proxy for the variable of household income in formula (1). Furthermore, we added the three religious factors on the schooling choices. Three major religions, Hindu, Christian and Muslim are popular in India, so we added population rate of three religions to the model. The data for analysis is based on the national survey by Ministry of Human Resources, India.[42]

Given the 0-1 nature of the dependent variable dropout of school, a maximum likelihood logit/probit estimation model was used to analyze enrolment and dropout decisions, because linear regression in such cases would have yielded inefficient results.

2.2 Macro-level Analysis

2.2.1 Discussion on Model

Khiliji *et al.* (2011) aimed to explain GDP growth by education expenditure, labor force participation and capital formation. The model that Khiliji *et al.* (2011) used to analyze in the study is based on the aggregate production function.

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

Y is output, A is technological progress, K is capital stock, L is labor force, and H is used for human capital. Human capital can be decomposed into two factors L, E where E is level of education. We can replace H with E, and rewrite the equation as,

$$Y = A.K^{\alpha}.L^{\beta}.E^{\gamma} \quad \ldots (4)$$

[42] 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. So, DISE is an initiative of the Department of Educational Management Information System (EMIS) 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.

Equation (4) above is used to develop the econometric model to determine the effect of education expenditure on economic growth. The data used in their study is taken from different sources, including the World Development Indicators, the state bank of Pakistan and economic survey of Pakistan. Natural logarithm has been taken for all variables. The variables used in the analysis include GDP growth, gross fixed capital formation, government expenditure on education as a percentage of GDP, labor force participation rate. In the empirical model Y represent real GDP growth. K is used for capital stock, L is used for labor force, and E is human capital measure. GDP growth is a measure of countries development of output or national income. 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 or "GFCF" 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 the study, Khiliji *et al.* (2011) aimed to determine the impact of education on economic growth so they have used "government education expenditure as a percentage of GDP" as measure of human capital.

$$LnY = \alpha + \beta 1Ln(EDUEXP) + \beta 2Ln(LFPR) + \beta 3Ln(GFCF) + \mu i \ldots (5)$$

List of Abbreviations:

Ln… Natural Logarithm

Y… GDP growth rate

EDUEXP… Government expenditure on education on education as % of GDP

LFPR… Labor force participation rate aged 15-24

GFCF… Gross fixed capital formation

μi… Error correction term

To determine the relationship between the GDP growth and all demographic variables, the authors used johansen co-integration test in the study. The co-integration result indicates the presence of error correction model. The error correction model combines the short- and long-

term relations between analyzed variables. The results of error correction model confirm the co-integration results and indicate the presence of error correction term for "GDP growth rate, gross fixed capital formation and labor force participation rate". Error correction equation shows correct negative sign for "GDP growth, labor force participation rate and gross fixed capital formation", the values for real GDP and labor force participation are highly significant. "-0.35" indicates that, about 35% of the previous disequilibrium has been removed in the present period for GDP growth rate. However, gross fixed capital formation show insignificant and education expenditure show no short run impact. The study also indicates capital stock and labor force participation in economic growth of the country as few key variables that seem to effect the economic development of Pakistan along with education in the long-run. The results confirm that education has a long run relationship of economic growth.

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 (5). 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 (5). The explained variable for macro-level model is the GDP growth and explanatory variables are the following factor:

$$LnY_i = \alpha + \beta Ln(EDEXP_i) + \beta_2 Ln(LFPR_i) + \beta_3 Ln(GFCF_i) + Ln(COMP_{i)} + Ln(PROG_{i)} \ldots (6)$$

List of Abbreviations:

Yi … GDP growth rate of a country i

Ln represents natural logarithm

EDEXPi … Government expenditure on education of country i

LFPRi … Labor force participation rate aged 15-24 of country i

GFCFi … Gross fixed capital formation of country i

COMPi … Completion rate in primary school of country i

PROGi … Progression rate from primary to secondary school of country i

Where Y is GDP growth rate, EDEXP is percentage of education expenditure by state government; GFCF means gross fixed capital formation and LFPR is labor force participation

rate of age 15-24. Ln represents natural logarithm. Because we would like to assess the impact of completion/dropout 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 World Bank defined the completion rate as *the total number of new entrants in the last grade of primary education, regardless of age, expressed as percentage of the total population of the theoretical entrance age to the last grade of primary in the country*. This indicator is also known as "gross intake rate to the last grade of primary. And the progression rate is defined as transition from primary (ISCED 1[43]) 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 sample seven countries are India, Pakistan, Bhutan, Sri lanka, Nepal and Iran. To analyze country-wise, we collect data from the World Bank's World Development Indicators. We removed two countries, Maldives and Afghanistan from the sample as most of the data of these countries could not be taken from.

[43] 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.

3 Analysis

3.1 Result of Micro-level Analysis

The result of Table 1 shows that participation rate of ECD program and populations of Christians have significant effect on drop-out rate of primary education[44]. Household and rate of Muslim population factors have positive effect on drop-out from primary schools. On the other hand, mother's education has negative effect. The parameter of monthly household income did not show significant effect; however, most of studies indicated that GDP per capita or related indicators have strong relation with school activity.

Since the logit regression model of this analysis assumes a non-linear functional relationship between the dependent and independent variables, we have reported the estimated "marginal effect" of each independent variable, which can be interpreted in the same fashion as ordinary regressions estimates. The probit/logit coefficients do not indicate the increase in probability of the event occurring, given a one unit increase in the corresponding dependent variable. However, the marginal effect (which are the values of the partial derivatives) do indicate the change in the probability of the occurrence of the event (school enrolment), given a one unit change in the independent variable, starting at the mean of the explanatory variables[45]. That is, they show the increment in the probability of participating in school, relative to the sample mean, corresponding to the particular characteristics. In the case of a dummy variable, the marginal effects indicate the change in probability of enrolment in school, for a discrete change of the dummy variable from 0 to 1.

[44] Complete statistical result, see Table 12 in Appendix.

[45] Psacharopoulos, Arriagada (1989)

Table 1 Statistics of Regressions of micro-level analysis

Constant term	0.406340977	
Partial regression coefficient		T-value
Household size	0.61439312	1.732260488
	[0.354677097]	
Monthly household income	-0.013550709	-0.260848801
	[0.051948518]	
Father's education	-0.09620306	-1.506715607
	[0.063849515]	
Mother's education	0.023929817	0.495719032
	[0.048272944]	
Participation rate of ECD program	-0.051613203**	-2.62837247
	[0.019636944]	
Rate of Christians	0.034376132***	2.896293397
	[0.011869009]	
Rate of Hindus	0.011207496	0.868424918
	[0.012905544]	
Rate of Muslims	0.006442882	0.472107894
	[0.013647054]	
R square	0.591472748	
Adjusted R square	0.409905081	

*, ** and *** represent P value 0.05 < P < 0.1, 0.01 <P < 0.05 and P < 0.01 respectively. Standard errors in [brackets].

3.2 Result of ADF Unit Root Test

The time series data is used in the macro-level analysis of this paper, the ADF test[46] is used for unit root problem in the six variables of all seven sample countries. The ADF test is

[46] Augmented Dickey–Fuller test (ADF) is a test for a unit root in a time series sample. It is an augmented version of the Dickey–Fuller test for a larger and more complicated set of time series models. The ADF statistic, used in the test, is a negative number. The more negative it is, the stronger the rejections of the hypothesis that there is a unit root at some level of confidence.

performed at level as well as first difference and second difference[47]. The outcome of ADF given below Table 2, which showed all variables are stationary at 2nd difference. Table 13 in Appendix showed that not all the variables are stationary at level and first difference from but at second difference all the variables become stationary. This indicates that the variables are integrated of same order.

Table 2 Result of ADF Unit Root Test for each sample

		Variable					
		LNY	LNGFCF	LNLFPR	LNEDEXP	LNCOMP	LNPROG
Countries	India	-5.115***	-5.499***	-2.277	-3.477***	-4.219***	-7.292***
	Sri lanka	-3.217**	-5.749***	-5.062***	-3.773***	-4.810***	-4.920***
	Bangladesh	-3.027**	-5.767***	-6.138***	-6.362***	-4.341***	-4.464***
	Bhutan	-4.154***	-2.769*	-2.991**	-6.855***	-3.376**	-4.401***
	Nepal	-5.035***	-5.543***	-2.480	-5.005***	-57.127***	-2.467
	Iran	-8.332***	-4.600***	-5.675***	-6.992***	-5.266***	-10.235***
	Pakistan	-2.601*	-4.070**	-2.711**	-5.237***	-4.236***	-4.236***

*, ** and *** denote 0.05 < P < 0.1, 0.01 < P < 0.05 and P < 0.001 each.

3.3 Result of Macro-level Analysis

Table 3 is the result of macro-level model[48]. Seven sample countries showed different results. Labor force participation showed significant negative result in three countries. Gross fixed capital formation showed positive effect in India. Progression rate to secondary education showed positive impact in two countries. Completion rate of primary education has been shown opposite result in Sri lanka and Bhutan; Sri Lanka showed significant negative result on primary completion, however, Bhutan showed opposite result; significant negative. This contradictory result may be caused from the difference of social/economic development

[47] Complete ADF test result, see Table 13 in Appendix.

[48] Full statistical result, see Table 4 India, Table 5 Sri lanka, Table 6 Bhutan, Table 7 Nepal, Table 8 Bangladesh, Table 9 Iran, Table 10 Pakistan and Table 11 all countries in Appendix.

grade in two countries. The analysis result from all countries indicated that government expenditure, primary completion and secondary progression have significant positive effect on economic growth. On the other hand, government expenditure did not show significant result in any countries.

We could not find any significant parameters in three countries; Nepal, Iran and Pakistan. From Table 8 and Table 10; Nepal and the Pakistan, R-square showed high values; the value of Nepal is 0.9558 and that of Pakistan is 0.9518, no parameters was observed significant. Government expenditure on education, labor force participation rate and drop-out rate from primary school have significant relationship with GDP growth. Three countries, India, Sri Lanka and Bhutan showed that the government expenditure on education has positive impact on GDP growth. Labor force participation rate showed negative effect on GDP growth in Nepal; however it has opposite result in Iran. Furthermore, drop-out rate of primary education obvious negative relation with natural logarithm of real GDP in Nepal. Drop-out rate of primary school has minus effect on GDP growth in all countries. On three coefficients; government expenditure, gross capital formation and drop-out rate of primary education, most of all countries showed similar result.

Table 3 Statistics of Regressions in comparison with 7 South Asian Countries

	India	Sri lanka	Bhutan	Bangladesh	Nepal	Iran	Pakistan	All countries
Constant term	18.26432486	31.90605906	8.475457233	74.54351923	4.345236474	15.43625493	-22.70680728	-2.610626882
Partial regression coefficient								
a) Government expenditure on education	0.024836168 [0.273468536]	0.170571987 [0.110472353]	-0.068459519 [0.167051749]	-1.799506402 [1.285849479]	1.558386754 [1.613776351]	1.901780261 [1.800876213]	-0.538636901 [0.539919333]	1.383837*** [0.418899]
b) Labor force participation rate	-1.82143152*** [0.524174365]	-1.353828985** [0.489278666]	0.87684427 [0.646450696]	-11.48146094*** [2.059887817]	1.789447148 [25.2331353]	-0.035597894 [2.338011058]	3.032676928 [11.44830185]	0.484868 [0.688901986]
c) Gross fixed capital formation	0.510534423*** [0.069211038]	0.009117545 [0.035638587]	-0.015200421 [0.041895625]	0.032589718 [0.100260854]	-0.002601472 [0.026965712]	0.058391305 [0.134160344]	0.851302832 [0.578693001]	0.161408088 [0.016102083]
d) Completion rate of primary education	-0.376863651 [0.545259276]	-1.653663647*** [0.434228789]	1.762416934*** [0.378129674]	-0.695802372 [1.728371328]	2.492001534 [6.136016152]	0.344331757 [2.685649031]	4.238938044 [2.227556248]	2.378118* [1.253656462]
e) Progression rate to secondary education	1.210819389** [0.414108636]	1.248414784*** [0.29330878]	0.359975241 [0.455601099]	1.334627524 [1.306282675]	-1.160105765 [2.211384824]	0.726349781 [1.313527009]	-0.157933691 [1.72873983]	2.571845** [1.173942931]
R square	0.998237337	0.984341093	0.997080992	0.621772	0.955772405	0.216877678	0.951772378	0.646447767
Adjusted R square	0.997135673	0.973156159	0.993432232	0.351609461	0.900487912	-0.139087013	0.871393009	0.624350753

*, ** and *** represent P value $0.05 < P < 0.1$, $0.01 < P < 0.05$ and $P < 0.01$ respectively. Standard errors in [brackets].

4 Concluding Remarks

This paper has focused on how early childhood development has impact on economic growth in developing countries in south Asia. To explain whether ECD has negative effect on drop-out from school, the result of regression analysis has been shown variable parameters of Table 1. The result proved that participation rate of pre-primary education and populations of Christians have significant relationship to drop-out rate in primary education. ECD participation works positively on dropout rate. Besides parent's literacy, especially mother's literacy and that household size did not show significant relation with drop-out. Monthly household income also could not prove negative impact on drop-out. Based on the result of Table3, we can state that the relationship between economic growth and drop-out rate was clearly proved in all countries. Seven sample countries showed different results. However, government expenditure on education has showed no significant result in 7 countries; except the result of all countries aggregate data. From this point, we can state that investment in conventional education system is not effective on economic growth in each countries level, although government/formal investment appeared significant positive in broader sight. Besides, completion of primary education and progression to secondary education showed positive impact on growth. This could be the evidence that improve in reduction of drop-out from primary schools could lead economic growth.

The result of two analysis models can confirm our hypothesis that ECD could lead economic growth by reducing drop-out of primary education and progression to secondary education. Considering the results of micro-level and macro-level model, it would be considered that ECD/pre-primary schooling has positive impact on reduction of drop-out rate from primary education, and drop-out reduction could lead economic growth in south-west Asian region. Unfortunately, the model could not prove the relationship between parent's education grade (especially mothers') and drop-out. However some literatures stated that ECD with good quality has positive effect on education for women, it could state that ECD has indirect but positive impact on economic development. In this paper, we did not discuss about quality of education. We treated output of ECD program and primary as standardized quality, though quality of ECD is marginalized amongst the countries[49].

[49] UNESCO (2007)

Therefore that "education quality is essential to increase the economic growth and human capital abilities for the country, the government with competent administration at the lower level, should increase the expenditure on education sector to promote research and development activities and improve the quality of education in order to improve the economy's growth performance. Fertility is negatively associated with female enrolment in primary and secondary education, urbanization, tertiary education, and female participation in labor force.[50] Further, it is positively associated with infant mortality and male enrolment in primary and secondary education. Son preference may dominate males' behaviors. Especially, males may have concerns of the continuity of family names. On the other hand, female education lowers fertility. Education may influence females' decisions in many ways such as delay marriage[51], high contraceptive usages[52] and higher opportunity costs due to higher wages.

[50] Akin (2005)

[51] Salehi-Isfahani (2000)

[52] Martin, Juarez (1995)

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Appendix

Macro-level Regression Result

Table 4 Statistical result of India

India	
Correlation R	0.999118
R2	0.998237
Adjusted R2	0.997136
Standard error	0.027519
Observed number	14

	Degree of freedom	Variation	Variance	Observed variance ratio	Level of significance
Regression	5	3.430962	0.686192	906.1174	8.69E-11
Residual	8	0.006058	0.000757		
Total	13	3.43702			

	Coefficient	Std. error	t	P-value	95% Lower conf. limit	95% Upper conf. limit
Intercept	18.26432	3.102435	5.887094	0.000367	11.1101	25.41855
LNGFCF	0.510534	0.069211	7.376488	7.79E-05	0.350933	0.670135
LNLFPR	-1.82143	0.524174	-3.47486	0.008383	-3.03018	-0.61268
LNEDEXP	0.024836	0.273469	0.090819	0.929869	-0.60578	0.655456
LNCOMP	-0.37686	0.545259	-0.69116	0.509018	-1.63423	0.880506
LNPROG	1.210819	0.414109	2.923917	0.019176	0.255883	2.165756

Table 5 Statistical result of Sri lanka

Sri lanka	
Correlation R	0.99214
R2	0.984341
Adjusted R2	0.973156
Standard error	0.051255
Observed number	13

	Degree of freedom	Variation	Variance	Observed variance ratio	Level of significance
Regression	5	1.15599	0.231198	88.00598	3.66E-06
Residual	7	0.01839	0.002627		
Total	12	1.17438			

	Coefficient	Std. error	t	P-value	95% Lower conf. limit	95% Upper conf. limit
Intercept	31.90606	3.917161	8.1452	8.12E-05	22.64345	41.16867
LNGFCF	0.009118	0.035639	0.255834	0.805434	-0.07515	0.093389
LNLFPR	-1.35383	0.489279	-2.76699	0.027814	-2.51079	-0.19687
LNEDEXP	0.170572	0.110472	1.544024	0.166494	-0.09065	0.431798
LNCOMP	-1.65366	0.434229	-3.80828	0.006643	-2.68045	-0.62688
LNPROG	1.248415	0.293309	4.256316	0.003764	0.55485	1.94198

Table 6 Statistical result of Bhutan

Bhutan	
Correlation R	0.998539
R2	0.997081
Adjusted R2	0.993432
Standard error	0.048482
Observed number	10

	Degree of freedom	Variation	Variance	Observed variance ratio	Level of significance
Regression	5	3.211599	0.64232	273.2657	3.72E-05
Residual	4	0.009402	0.002351		
Total	9	3.221001			

	Coefficient	Std. error	t	P-value	95% Lower conf. limit	95% Upper conf. limit
Intercept	8.475457	2.255999	3.756854	0.019829	2.211801	14.73911
LNGFCF	-0.0152	0.041896	-0.36282	0.735101	-0.13152	0.10112
LNLFPR	0.876844	0.646451	1.356398	0.246481	-0.91799	2.671679
LNEDEXP	-0.06846	0.167052	-0.40981	0.702943	-0.53227	0.39535
LNCOMP	1.762417	0.37813	4.66088	0.009583	0.712561	2.812273
LNPROG	0.359975	0.455601	0.790111	0.473667	-0.90498	1.624927

Table 7 Statistical result of Bangladesh

Bangladesh	
Correlation R	0.976149
R2	0.952868
Adjusted R2	0.919202
Standard error	0.087296
Observed number	13

	Degree of freedom	Variation	Variance	Observed variance ratio	Level of significance
Regression	5	1.078459	0.215692	28.30363	0.000167
Residual	7	0.053344	0.007621		
Total	12	1.131803			

	Coefficient	Std. error	t	P-value	95% Lower conf. limit	95% Upper conf. limit
Intercept	74.54352	8.339406	8.938709	4.46E-05	54.82396	94.26308
LNGFCF	0.03259	0.100261	0.325049	0.754643	-0.20449	0.269669
LNLFPR	-11.4815	2.059888	-5.57383	0.000839	-16.3523	-6.6106
LNEDEXP	-1.79951	1.285849	-1.39947	0.204393	-4.84006	1.241044
LNCOMP	-0.6958	1.728371	-0.40258	0.69927	-4.78275	3.391146
LNPROG	1.334628	1.306283	1.021699	0.340929	-1.75424	4.423495

Table 8 Statistical result of Nepal

Nepal	
Correlation R	0.977636
R2	0.955772
Adjusted R2	0.900488
Standard error	0.109848
Observed number	10

	Degree of freedom	Variation	Variance	Observed variance ratio	Level of significance
Regression	5	1.043052	0.20861	17.28825	0.008183
Residual	4	0.048266	0.012067		
Total	9	1.091318			

	Coefficient	Std. error	t	P-value	95% Lower conf. error	95% Upper conf. limit
Intercept	4.345236	131.2203	0.033114	0.97517	-359.981	368.6712
LNGFCF	-0.0026	0.026966	-0.09647	0.927785	-0.07747	0.072267
LNLFPR	1.789447	25.23314	0.070917	0.946868	-68.269	71.84786
LNEDEXP	1.558387	1.613776	0.965677	0.388891	-2.92217	6.038948
LNCOMP	2.492002	6.136016	0.406127	0.705437	-14.5443	19.52831
LNPROG	-1.16011	2.211385	-0.52461	0.627587	-7.29989	4.979683

Table 9 Statistical result of Iran

Iran	
Correlation R	0.465701
R2	0.216878
Adjusted R2	-0.13909
Standard error	0.448067
Observed number	17

	Degree of freedom	Variation	Variance	Observed variance ratio	Level of significance
Regression	5	0.611595	0.122319	0.609267	0.695177
Residual	11	2.208403	0.200764		
Total	16	2.819997			

	Coefficient	Std. error	t	P-value	95% Lower conf. limit	95% Upper conf. limit
Intercept	15.43625	15.24391	1.012618	0.332999	-18.1154	48.98788
LNGFCF	0.058391	0.13416	0.435235	0.671808	-0.23689	0.353676
LNLFPR	-0.0356	2.338011	-0.01523	0.988125	-5.18153	5.11033
LNEDEXP	1.90178	1.800876	1.056031	0.313596	-2.06192	5.865482
LNCOMP	0.344332	2.685649	0.128212	0.900295	-5.56674	6.255405
LNPROG	0.72635	1.313527	0.552977	0.59134	-2.1647	3.617403

Table 10 Statistical result of Pakistan

Pakistan	
Correlation R	0.975588
R2	0.951772
Adjusted R2	0.871393
Standard error	0.116355
Observed number	9

	Degree of freedom	Variation	Variance	Observed variance ratio	Level of significance
Regression	5	0.801543	0.160309	11.841	0.034413
Residual	3	0.040615	0.013538		
Total	8	0.842158			

	Coefficient	Std. error	t	P-value	95% Lower conf. limit	95% Upper conf. limit
Intercept	-22.7068	36.24547	-0.62647	0.575435	-138.056	92.64247
LNGFCF	0.851303	0.578693	1.471079	0.237642	-0.99036	2.692962
LNLFPR	3.032677	11.4483	0.264902	0.808243	-33.4009	39.46628
LNEDEXP	-0.53864	0.539919	-0.99762	0.391986	-2.2569	1.179627
LNCOMP	4.238938	2.227556	1.902954	0.153185	-2.85014	11.32802
LNPROG	-0.15793	1.72874	-0.09136	0.932967	-5.65956	5.343688

Table 11 Statistical result of all countries aggregated

All countries	
Correlation R	0.80402
R2	0.646448
Adjusted R2	0.624351
Standard error	1.254666
Observed number	86

	Degree of freedom	Variation	Variance	Observed variance ratio	Level of significance
Regression	5	230.264	46.0528	29.25498	9.16E-17
Residual	80	125.9349	1.574187		
Total	85	356.1989			

	Coefficient	Std. error	t	P-value	95% Lower conf. limit	95% Upper conf. limit
Intercept	-2.61063	5.231124	-0.49906	0.619109	-13.0209	7.799641
LNGFCF	0.161408	0.016102	10.02405	8.68E-16	0.129364	0.193452
LNLFPR	0.484868	0.688902	0.703828	0.483584	-0.88609	1.855827
LNEDEXP	1.383837	0.418899	3.303513	0.00143	0.550202	2.217471
LNCOMP	2.378118	1.253656	1.896946	0.061444	-0.11674	4.872974
LNPROG	2.571845	1.173943	2.190775	0.031378	0.235624	4.908066

Micro-level Regression Result

Table 12 Statistical result of micro-level model

Statistical regression	
Correlation R	0.769073
R2	0.591473
Adjusted R2	0.409905
Standard error	0.675454
Observed number	27

	Degree of freedom	Variation	Variance	Observed variance ratio	Level of significance
Regression	8	11.88989	1.486236	3.257589	0.017815
Residual	18	8.212288	0.456238		
Total	26	20.10218			

	Coefficient	Std. error	t	P−value	95% Lower conf. limit	95% Upper conf. limit
Intercept	0.406341	3.278186	0.123953	0.902726	−6.48087	7.293555
HHSIZE	0.614393	0.354677	1.73226	0.100327	−0.13076	1.359542
FGED	−0.0962	0.06385	−1.50672	0.149233	−0.23035	0.03794
MGED	0.02393	0.048273	0.495719	0.626091	−0.07749	0.125348
ECY	−0.05161	0.019637	−2.62837	0.01705	−0.09287	−0.01036
MHHI	−0.01355	0.051949	−0.26085	0.79717	−0.12269	0.095589
HND	0.011207	0.012906	0.868425	0.396593	−0.01591	0.038321
MSLM	0.006443	0.013647	0.472108	0.642523	−0.02223	0.035114
CHRST	0.034376	0.011869	2.896293	0.009622	0.00944	0.059312

ADF test Unit Root Test result

Table 13 Result ADF test for each sample

India	Test statistic		
	Level	1st difference	2nd difference
LNY	0.851	-3.345**	-5.115***
LNGFCF	-0.151	-3.424**	-5.499***
LNLFPR	0.941	-1.357	-2.277
LNEDUEXP	-1.603	-1.477	-3.477***
LNCOMP	-1.618	-2.858*	-4.219***
LNPROG	-0.193	-6.438***	-7.292***

Sri lanka	Test statistical		
	Level	1st difference	2nd difference
LNY	-0.930	-2.674*	-3.217**
LNGFCF	-3.095**	-4.462***	-5.749***
LNLFPR	-1.990	-3.243**	-5.062***
LNEDUEXP	-1.409	-2.768*	-3.773***
LNCOMP	-2.697*	-3.186**	-4.810***
LNPROG	-1.175	-3.703***	-4.920***]

Bangladesh	Test statistic		
	Level	1st difference	2nd difference
LNY	3.029	-1.489	-3.027**
LNGFCF	-2.990*	-4.375***	-5.767***
LNLFPR	-1.214	-7.514***	-6.138***
LNEDUEXP	-2.136	-5.004***	-6.362***
LNCOMP	-1.095	-2.612*	-4.341***
LNPROG	-0.970	-2.561	-4.464***

Bhutan	Test statistic		
	Level	1st difference	2nd difference
LNY	0.031	-2.682*	-4.154***
LNGFCF	-3.006**	-3.306**	-2.769*
LNLFPR	-2.136	-1.836	-2.991**
LNEDUEXP	-2.903*	-5.481***	-6.855***
LNCOMP	-0.182	-2.087	-3.376**
LNPROG	0.826	-1.622	-4.401***

Nepal	Test statistic		
	Level	1st difference	2nd difference
LNY	1.333	-3.294**	-5.035***
LNGFCF	-3.788***	-5.010***	-5.543***
LNLFPR	-1.766	-0.598	-2.480
LNEDUEXP	-0.759	-4.450***	-5.005***
LNCOMP	-2.035	-32.537***	-57.127***
LNPROG	-1.618	-2.052	-2.467

Pakistan	Test statistic		
	Level	1st difference	2nd difference
LNY	-1.995	-2.287	-2.601*
LNGFCF	-1.502	-1.701	-4.070**
LNLFPR	-1.498	-1.571	-2.711**
LNEDUEXP	-1.342	-2.340	-5.237***
LNCOMP	-3.650**	-5.084***	-4.236***
LNPROG	-2.748*	-3.553**	-4.236***

Iran	Test statistic		
	Level	1st difference	2nd difference
LNY	-1.523	-4.393***	-8.332***
LNGFCF	-2.641*	-3.507**	-4.600***
LNLFPR	-1.804	-2.424	-5.675***
LNEDUEXP	-4.564***	-6.406***	-6.992***
LNCOMP	-2.397	-3.587**	-5.266***
LNPROG	-3.288**	-3.127**	-10.235***

*, ** and *** represent P value $0.05 < P < 0.1$, $0.01 < P < 0.05$ and $P < 0.01$ respectively.