EARLY CHILDHOOD EDUCATION AND CHILD DEVELOPMENT OUTCOMES IN LEAST DEVELOPED COUNTRIES: EMPIRICAL EVIDENCE FROM LAO PDR

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ABSTRACT

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Given the benefits of early childhood education, many countries try to ensure universal accessibility to early childhood education. However, with their limited budgets and chronic poverty, least developed countries face a huge disadvantage in providing access to early childhood education, especially for children of lower income families and those living in remote areas. This study aims to determine how accessibility to early childhood education and child development affects cognitive, learning, physical, and social-emotional readiness. We use nationally representative data from the Lao Social Indicator Survey (LSIS) for a case study of Lao PDR, which is representative of least-developed countries. Our estimation indicates that mother's educational attainment and economic status of the family have an important impact on children's preschool enrollment. In terms of children's development, receiving early childhood education is likely to play a significant role in developing cognitive skills. Furthermore, in addition to early childhood education per se, activities associated such education also play an important role in fostering children's development. Hence, early childhood education should be promoted in order to enhance all children's access to preschools and thus ensure that their development remains on track.

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Manivone Phongsopha

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TABLE OF CONTENTS

Page

LISTS OF TABLES

Tables **Page**

CHAPTER 1

INTRODUCTION

Education is viewed as an investment in human capital that enhances the nature of individuals' lives in ways that bring advantages to their personal and economic prosperity (Acemoglu & Autor, 2011). Even though at the national level increasing educational attainment may not appear to return measureable positive economic outcomes, the practical difficulties with using of cross-national data on year of schooling level are so serious that applying aggregate data for any reason for which individual level data would do should be avoided. Their study found that the differences in the evolution and dynamics of schooling were insignificant in explaining the evolution and dynamics of output growth (Pritchett, 2008). When human capital is measured in terms of cognitive skills, the benefits become more apparent. Cognitive skills are evaluated by examining the simple average of all observed math and science scores for each country, primary through end of secondary school, according to the Program for International Student Assessment (Hanushek & Woessmann, 2012).

Heckman (2012) has shown that the critical time for strengthening cognitive skills is from birth to age five, when the brain grows quickly as it establishes the cognitive capabilities and character traits fundamental for achievement in school, well-being, employment, and life. According to the World Bank, this process has five steps, called "STEP" (Skills Toward Employment and Productivity). The "Skills Toward Employment and Productivity" STEP framework is a simple conceptual framework focused on 5 interlinked steps including Step 1: Getting children off to the right start; Step 2: Ensuring that all students learn; Step 3: Building job-relevant skills that employers demand; Step 4: Encouraging entrepreneurship and innovation; and Step 5: Matching the supply of skills with the demand (Banerji, 2010). The first step, "getting children off to the right start," is crucial for human productivity and lifelong learning and needs to occur early in a child's life.

Accordingly, early childhood education, including ensuring access to preschool, has been given policy precedence in various countries. The considerable transformation that occurs in preschool may concentrate on one or several aspects of children's development (UNESCO, 2006). For example, learning early in life is essential for development of those human skills that are needed in the long term (Opel, Ameer, & Aboud, 2009). In addition, the beneficial outcome of attending preschool has been found to lower the chance of early drop-out and grade failure, as well as to increase IQ scores (Berlinski, Galiani, & Manacorda, 2008).

However, a study by Loeb, et al. (2004) has found negative impacts of early childhood education. They found that even though children who had attended preschool tended to have higher cognitive scores, such children tended to exhibit more aggressive behavior compared to those children who did not participate in early childhood education. In addition, it was found that early childhood programs tended to have negative effects on social behavior (Loeb, et al., 2007). Although early childhood education benefited children in the future, they often suffered from psychological problems such as lack of concentration (Magnuson, Ruhm, & Waldfogel, 2007).

In developed countries, for example, the United Kingdom, with its Effective Provision of Pre-school Education (EPPE) project, children's intellectual and social-emotional well-being were enhanced and the good results of this evidenced during their first three years in primary education. The Effective Provision of Pre-School Education (EPPE) project is the first major European longitudinal study of a national sample of young children's development between the ages of 3 and 7 years to investigate the effects of pre-school education on 3,000 children. Nevertheless, the activities of parents and children played an important role in helping children, especially disadvantaged children, to develop on track (Siraj-Blatchford et al., 2004). Furthermore, in the United States there are special public programs such as the "Carolina Abecedarian Project," the "Chicago Child-Parent Center Program," and the "Perry Preschool Project," which focus on supporting children's development and creating opportunities for children from economically disadvantaged families.

The Carolina Abecedarian Project was an extension of the Perry Preschool Project and carried out by the University of North Carolina's FPG Child Development

Institute from 1972 to 1977. It intended to improve the language skills of children from their infancy to five years of age (Campbell & Ramey, 2007). The Chicago Child-Parent Center Program was implemented in 1967. It provided preschool education for children from disadvantaged families. Parent participation was required on Sundays. Currently, there are still 11 schools hosting this program in Chicago (Besharov, Higney, & Call, 2011). The Perry Preschool Project was conducted from 1962 to 1967 with the main objective of providing preschool education to disadvantaged African American children. School activities focusing on developing students' skills as well as parent participation were particularly encouraged (Heckman, Moon, Pinto, Savelyev, & Yavitz, 2010). Additionally, MacEwan (2013) has studied the cost-benefit analysis of these three programs and found that children who participated in such programs tended to do better in their studies, have lower rates of premature pregnancy, to be less likely to be involved in crime, and to have occupations with higher earnings than did kids who did not participate in preschool programs.

In recognition of the importance of early childhood intervention, Sweden's National Curriculum for Preschool, which emphasizes lifelong learning, has provided free pre-primary education for children from ages one to five, ensuring that all children get the same opportunities in life regardless of the economic status of their family (Education in Sweden, 2015). In addition, Stoop (2011) found that in New Zealand a specific preschool education is required for every child at least three years old to make sure that the child grows up with skills and learning abilities.

Due to the fact some countries face severe economic restrictions that aggravate education inequality, 159 million children, or half of all age three-to-six-year-olds across the world, do not have access to early childhood education, and more than 200 million children under five bear of developmental loss (Institute for Statistics, 2012). Although developing countries have expanded access to preschool, and there has been an increase in pre-primary enrollment in all regions over the past decade, today children from the poorest families are still largely unable to gain access (World Bank, 2015).

Unequal access to early childhood education also has a negative effect on cognitive development and reduces the readiness to learn at the primary education

level (Anderson et al., 2003). Moreover, in developing countries children from rich families are much more likely to go to preschool than are children from poor families, resulting in disadvantages in the proper development of these children (Nonoyama-Tarumi & Ota, 2011).

Mexico is a developing country that made pre-primary education compulsory in 2002, yet unequal access remains a challenge as is the fact that there are public preschools which have poor facilities, few resources, and less-qualified teachers (Santibañez, Vernez, & Razquin, 2005). Corresponding to the advantages of early childhood education, Pholphirul (2016) assessed the access to and the long term benefits of pre-primary education for Thai students by using test scores from PISA. Results indicated that early childhood education had a significant effect on scores in reading, mathematics, and science when the children reached age 15.

Given the benefits of pre-primary education, both in developed and developing countries, it would seem to make sense to make early childhood education universally available, especially to disadvantaged children. However, with limited budgets and chronic poverty, least developed countries face a huge disadvantage with regard to providing access to preschool education for lower income families and for children in remote areas.

Even though preschool education is important for children as they just begin learning, many least developed countries do not place enough importance on preschool accessibility. Bangladesh, for example, is a least developed country in which disadvantaged children have low rates of access to preschool education because, evidently, no department or ministry of education has taken seriously enough the issue of preschool education at the national level (Nath & Sylva, 2007).

Furthermore, many least developed countries stress the importance of primary and even higher education and make primary school attendance compulsory even though preschool education is lacking. In Cambodia, for example, where Rao and Pearson (2007) examined childcare and education policies, 80 percent of Cambodians live in rural areas, yet almost no rural children are enrolled in early childhood education.

Likewise, Lao PDR, a country with many ethnic and linguistic groups, still has some of poorest education indicators in Southeast Asia (King, 2010). This

demographic diversity results in unbalanced opportunity for early childhood education across the various ethnic groups. Only about 30 percent of the total population of formal preschool education age attended preschools in 2014. Moreover, since preschool education is not compulsory, parents themselves need to decide whether to send their child to preschool (Unicef, 2012).

Until the school year 2014-2015, the Ministry of Education and Sport reported that the number of students enrolled in public early childhood education increased to 125,770 and that 33,721 children were enrolled in private schools (MOEs, 2015). However, nearly 60 percent of private early childhood education enrollment was in Vientiane, the capital, and in two provinces in the north (Saravan and Phongsaly) were no private early childhood education so far; This implies inequality of access to early childhood education in Lao PDR. Although community-based early childhood education is provided by the Education Department, it is not the same standard as formal early childhood education classes because the caregivers are not trained as formal teachers. This has become a serious problem for disadvantaged children in poor communities and remote areas in Laos (UNESCO, 2015).

1.1 Objectives of the Study

Differences in the management of preschool education programs between early childhood education centers and community-based programs bring up research questions regarding:

1. How to estimate the probability of access to early childhood education
2. Whether children who receive early childhood education do in fact make progress in terms cognitive, learning, physical, and social-emotional readiness.

1.2 Scope of the Study

Although there were some short-term and long-term studies assessing these qualities, studies using a national representative survey dataset are rare. The present study is the first time that a survey such as the Lao Social Indicator Survey (LSIS) 2011-2012 was used to analyze research questions on accessibility of early childhood education. LSIS was developed by the Statistics Division, Department of Planning

and Finance (Ministry of Health) and the Lao Statistics Bureau (Ministry of Planning). This study uses secondary nationally representative data obtained from the first Lao Social Indicator Survey (LSIS) 2011-2012 that was conducted to measure compliance with the Millennium Development Goals (MDGs) and the 7th National Social-Economic Development Plan (NSEDP).

The LSIS employed probability sampling methods to ensure that it was nationally representative. The sampling was based on three-stage sampling with implicit stratification, a type of geographic stratification that automatically distributes the sample proportionate to each subdivision. In the first stage, primary sampling units were defined in the country based on the latest census enumeration areas. In the second stage, one cluster (20 households) was randomly selected from each primary sampling unit. Then, in the third stage, households in each cluster were systematically selected for an interview. As a general rule, the overall sample comprised 20,000 households from 16 provinces and Vientiane, the capital city.

1.3 Benefit of the Study

Nationally representative data can suggest appropriate remedial policies for the nation as opposed to studies based on a specific group of children, which can cause difficulties when formulating recommendations for policies at a national level. The paper is divided into four parts. The next section assesses Lao children's access to early childhood education. The third section quantifies the impacts of childhood education on child development outcomes. The last section provides conclusions and policy recommendations.

CHAPTER 2

THE ACCESSIBILITY OF EARLY CHILDHOOD EDUCATION

This study employed cross-sectional data from 3,869 children from the 2012 Lao Social Indicator Survey. Questions focused on three- and four-year-olds to assess their early learning by determining whether they currently attended any organized learning or early childhood education program, including kindergarten or community child care. The scope of the LSIS 2011-2012 included private households in Lao PDR, men and women 15-49 years old, and children under five years old. For the analysis of Early Childhood Care and Education (ECCE), this study uses data from questionnaires focusing on the household and children under five. The household questionnaire provides data on household composition, location of residence, household wealth and education level, and schooling of household members. The questionnaire for all children under five and each child in the household collected data on early learning, child development, and immunization. This questionnaire asked about mothers or caretakers who care for a child under the age of 5 years and who lives with such children.

This article examines the level of accessibility to early childhood education by gender, place of residence, ethnicity, language, mother's education, father's education, and household wealth. Household wealth is constructed using principal component analysis and includes several items, such as what material is used for a dwelling's floor, number of rooms in dwelling, main source of drinking water, toilet facility used, and presence of electricity, radio, television, or refrigerator. In addition, questions were asked about whether any members of household own a bicycle or car, and what main cooking fuel was used. Therefore, we have categorized indicators into five levels: (1) extremely poor, (2) poor, (3) middle, (4) wealthy, and (5) extremely wealthy, with the lowest 20 quintile referring to samples with extremely poor status, while the highest 20 quintile referring to samples with extremely wealthy status. Fundamental statistical analysis of the data shows that 3,869 children were sampled – 2,004 three-year-olds and 1,865 four-year-olds.

Table 2.1 below shows Lao children's accessibility to early childhood education. From the sample of 3,869 children, only 717 children (18.53 percent) had access to preschool education. Descriptive statistics show that around 75 percent of students were living with a household head who spoke Lao-Tai language. In addition, 61.65 percent of children who were living with a household head who was of Lao ethnicity were more likely to be enrolled in preschools than were children living in a household headed by a member of a different ethnic group. Whereas 44.63 percent of students lived in municipality areas, 46.72 percent of this group lived in the Central region, which was more than the number of students living in the North and South.

Furthermore, grouping children according to their parents' educational attainment indicated that students living with parents who completed secondary education tended to be more likely to enroll in preschool. Table 1 shows that up to 35.7 percent of children whose mothers completed secondary education tended to enroll in preschool, as did 38.21 percent whose fathers did so. The ratio of preschool education enrollment of students living with mothers who had no education was 12.28 percent and for those living with fathers with no education was 4.33 percent. Additionally, the data show that 38.63 percent of students from extremely wealthy households had access to preschool education, whereas only 9.35 percent of children from extremely poor households had similar access. Since preschool education is not compulsory in Lao PDR, it is reasonable to assume that accessibility to early childhood education is largely determined by socioeconomic factors of children's families. However, in the LSIS survey, questions concerning early childhood education asked only whether a child attended any organized learning or early childhood education program, such as a private or government facility, including kindergarten or community child care.

Since it is crucial to estimate accessibility or probability in quantitative terms, we applied econometric models to control all influential factors. In this study, a bivariate probit model was used to estimate the probability of accessing preschool education. The value of the dependent variable equals 1 if a child participated preschool education and 0 if a child did not. The estimate is divided into three groups – three-year-olds, four-year-olds, and lastly, a total sample of three- and four-year olds together. The reason a sample of four-year-olds is analyzed separately here is that

there is a tendency, due to the fact that preschool education is non-compulsory, for some children to not start their early childhood education in their first year of kindergarten, but to start preschool in a later year (second or third year).

Independent variables were obtained from children's characteristics, namely, gender (male and female), language group of household head (Lao-Tai, Mon-Khmer, Hmong-Mien, and Chinese-Tibetan), ethnicity of household head (Lao, Khmu, Hmong, and other), family's place of residence (urban area, rural area with road, and rural area without road), region (North, Central, and South), parents' educational attainment (no formal education, primary school, secondary school, and higher than secondary school, including vocational/tertiary school), and wealth (extremely poor, poor, middle, wealthy, and extremely wealthy), all of which can describe children's socioeconomic background.

The estimation in Table 2.2 shows that children living in urban areas had a higher probability of attending preschool than did a children living in rural areas without roads, by 8.49 percent. Children living in the North tended to attend preschool at a higher rate than did children living in the South by 12.9 percent. In addition, students living in higher income families tended to have more support from their family to pursue their preschool education. Especially, there was found significant probability of attending preschool among children from extremely wealthy families, by 44.1 percent compared to children from extremely poor families. Higher income of a family was a key factor in supporting children's access to preschool.

Furthermore, results indicate a significantly positive impact of the educational attainment of parents on students' probability of attending preschool. Students living with mothers who had completed secondary education tended to have a higher probability (by 8.48 percent) of attending preschool than did students living with mothers who had no education. Moreover, there was an even stronger likelihood (by 30.3 percent) for students living with mothers who had completed higher than secondary education to go to preschool than for students living with mothers who lacked such education to do so. The figure for children living with fathers with post-secondary education was 17.7 percent (higher than for children whose fathers lacked such education).

Interestingly, results indicate that mothers' educational attainment was found

to have a greater impact on students' probability of attending preschool than did fathers' educational attainment, for both three- and four-year-olds. This suggests that mothers play a crucial role in childrearing and education, especially with regard to sending their children to school.

Table 2.1 Ratio of children's access to early childhood education by family background of three-year-olds, four-year-olds, and both ages (percent)

Variables	Having participated in early childhood education		
	Age 3 years	Age 4 years	Total
Gender			
Male	11.66	22.52	47.28
Female	12.41	28.83	52.72
Language group of household head			
Lao-Tai	24.41	43.22	74.9
Mon-Khmer	4.07	13.49	17.43
Chinese-Tibetan	4.67	14.15	2.79
Hmong-Mien	2.71	9.52	4.88
Ethnicity of household head			
Lao	25.52	42.64	61.65
Khmu	6.27	18.36	9.21
Hmong	2.53	9.85	4.74
Other	7.03	17.78	24.4
Residence			
Urban	38.69	65.74	44.63
Rural with road	7.37	19.63	51.46
Rural without road	2.46	9.52	3.91
Region			
North	10.97	26.46	42.68
Central	18.39	32.54	46.72
South	5.52	15.98	10.6
Mother's education attainment			
None	2.74	9.24	12.28
Primary	8.14	22.06	33.89
Secondary	30.31	59.77	35.7
Higher than secondary	70.37	93.59	18.13
Father's education attainment			
None	1.92	7.10	4.33
Primary	4.91	15.27	25.94
Secondary	18.16	41.61	38.21
Higher than secondary	49.48	74.86	31.52
Economic status			
Extremely poor	1.90	7.65	9.35
Poor	4.01	14.48	11.58
Middle	11.11	28.66	17.43
Wealthy	21.83	46.81	23.01
Extremely wealthy	62.16	83.08	38.63
Total (person)	2,004	1,865	3,869

Source: Authors' calculation from LSIS 2011-2012

Table 2.2 Estimation using Binary Probit Model (Marginal Effect) of access to early childhood education for three-year-olds, four-year-olds, and both ages

Independent variables	Three-year-	Four-year-	Total
Four-year-olds (reference: three-year-	-	-	0.157***
	-	-	(0.0121)
Female (reference: Male)	0.00861	0.0656***	0.0337***
	(0.0104)	(0.0212)	(0.0111)
Language (reference: Hmong-Mien)			
Lao-Tai language	0.0471	0.999***	0.218*
	(0.0778)	(0.000352)	(0.130)
Mon-Khmer language	0.0165	0.999***	0.176
	(0.0724)	(0.000272)	(0.132)
Chinese-Tibetan language	0.00273	0.886***	0.134
	(0.0731)	(0.00771)	(0.170)
Ethnicity (reference: Others)			
Lao ethnicity	0.00358	-0.0566	-0.0159
	(0.0173)	(0.0390)	(0.0192)
Khmu ethnicity	-0.0185	-0.0260	-0.0238
	(0.0195)	(0.0409)	(0.0209)
Hmong ethnicity	-0.0437	0.957***	0.0466
	(0.0382)	(0.00450)	(0.125)
Area (reference: Rural without road)			
Urban	0.0737*	0.0919*	0.0849**
	(0.0410)	(0.0554)	(0.0333)
Rural with road	0.0165	0.00594	0.0128
	(0.0206)	(0.0364)	(0.0201)
Region (reference: South)			
North	0.0768***	0.187***	0.129***
	(0.0229)	(0.0407)	(0.0226)
Central	0.0190	0.0367	0.0280
	(0.0190)	(0.0336)	(0.0185)
Mother's education attainment (reference: Uneducated)			
Primary	0.00515	0.0265	0.0136
	(0.0161)	(0.0291)	(0.0159)
Secondary	0.0472*	0.138***	0.0848***
	(0.0262)	(0.0493)	(0.0268)
Higher than secondary	0.179***	0.473***	0.303***
	(0.0671)	(0.103)	(0.0636)

Table 2.2 (Continued)

Father's education attainment (reference: Uneducated)			
Primary	0.0125	0.0250	0.0181
	(0.0220)	(0.0363)	(0.0205)
Secondary	0.0416	0.132***	0.0816***
	(0.0296)	(0.0484)	(0.0281)
Higher than secondary	0.122**	0.212***	0.177***
	(0.0542)	(0.0719)	(0.0455)
Economic status (reference: Extremely poor)			
Poor	0.00599	0.0722**	0.0357*
	(0.0195)	(0.0341)	(0.0194)
Middle	0.0525*	0.195***	0.118***
	(0.0273)	(0.0435)	(0.0263)
Wealthy	0.0898**	0.271***	0.181***
	(0.0375)	(0.0542)	(0.0349)
Extremely wealthy	0.291***	0.533***	0.441***
	(0.0717)	(0.0624)	(0.0505)
Pseudo R-squared	0.3772	0.3280	0.3653
Observations	2,004	1,865	3,869

Source: Authors' computation. Data from the Lao Social Indicator Survey (LSIS) 2011-2012

Note: *** p<0.01, ** p<0.05, * p<0.1; Standard errors in parentheses

CHAPTER 3

MEASURING IMPACTS ON CHILD DEVELOPMENT

To show the importance of education during preschool age in preparing children for compulsory education (primary level), this section will compare children's development with and without exposure to an early childhood education program. To measure development in early childhood, the LSIS developed an index called "Early Childhood Development Index (ECDI)." The Early Child Development Index (ECDI) launched a data revolution for the Sustainable Development Goals and is used as an index of developmental potential in early childhood, currently represented in the Multiple Indicator Cluster Survey (MICS) that assesses children aged 36-59 months in four domains. Each of these four domains is measured through instruments based on real time observation, which refers to the ability of children in cognitive readiness, physical readiness, learning readiness, and social-emotional readiness. The MICS surveys calculates an overall Index Score as the percentage of children aged 36-59 months who are on track in at least three of four domains (UNESCO, 2015).

There are a ten yes/no questions used to determine whether children have achieved at least two of the criteria in each of four domains so as to be developmentally on track (UNICEF, 2011). The four domains in question are:

1) Cognitive readiness: (1) Children can identify/name at least ten letters of the alphabet, (2) they can read at least four simple and popular words, and (3) they know the name and recognize the symbols of all numbers from 1 to 10. If at least two of these are true, then the child is considered developmentally on track
2) Learning readiness: (1) Children can follow simple directions on how to do something correctly, and (2) when given something to do, are able to do it independently. If so, they are regarded as being developmentally on track in the learning domain

3) Physical readiness: (1) They can pick up a small object with two fingers, like a stick or a rock from the ground, and (2) the mother/caretaker does not indicate that the child is sometimes too sick to play. If so, then the child is considered to be developmentally on track in this domain
4) Social-emotional readiness: Children are considered to be developmentally on track if two of the following are true: (1) if the children can get along well with other children, (2) if they do not kick, bite, or hit other children, and (3) if they do not get easily distracted.

Table 3.1 presents assessment outcomes of children's development. On average, Lao children presented low cognitive skills in terms of learning readiness, physical readiness, and social-emotional readiness. However, children who received early childhood education seem to have higher cognitive skills than children who did not.

In the context of language spoken, children living with a household head who spoke Mon-Khmer language on average had lower cognitive readiness than children living with a household head who spoke another language. However, development can vary, according to several factors, including a child's individual characteristics, family characteristics, and interaction with others. It is possible that there may have been some distortion in measuring development of children participating and those not participating in early childhood education. Hence, we applied an econometrics model in this estimation to control for the variables described below:

1. Children's characteristics including receiving early childhood education, gender, language spoken by the household head, and ethnicity of the household head
2. Family characteristics including residential area, region of the country, mother's educational attainment, father's educational attainment, and economic status
3. Activity with children including reading books to or looking at picture books with children, telling stories to children, singing songs to children or with children, taking children outside the home/compound/yard/enclosure, playing with children, and naming/counting/drawing things with children.

After taking into account to be a control variable for children's development, we estimate a probit model to quantify impacts of early childhood education on child development outcomes. Table 4 shows that children living in municipal areas and in rural areas with a road had significantly higher probability of cognitive readiness than did children living in rural areas with no road. Children living in the North and the Central regions were more likely to have problems with learning readiness but had higher probability of social-emotional readiness than did children living in the South. Additionally, children living with a household head who spoke Chinese-Tibetan had lower probability of learning readiness by 23.5 percent but had higher probability of 17.2 percent than children living with a household head who spoke Hmong-Mien language. Furthermore, children living with an ethnic Lao or Khmu household head were likely to have learning readiness but had lower probability of social-emotional readiness than did children living with household heads of other ethnic groups.

Moreover, when mothers had completed higher than secondary education, their children were more likely to have cognitive skills (by 8.05 percent) and also learning skills (by 12 percent) than children living with mothers who were uneducated. We also found that children living with fathers who had completed primary education had 2.84 percent higher probability of learning readiness than children living with fathers who were uneducated.

As for economic status, the estimation found that children from high-income families were more likely to have cognitive readiness than children from extremely poor families. However, children from extremely wealthy families had significantly higher probability of social-emotional readiness than children from extremely poor families by 5.56 percent. In addition, children who were breastfed had 8.77 percent higher probability of social-emotional readiness than children who were not breastfed.

Regarding children's interaction with others, when mothers and fathers were involved in reading books or looking at picture books and naming/counting/drawing things with children, the children had significantly higher probability of cognitive readiness than did children who had nobody doing activities with them. And children who had mothers who sang songs to or with them also tended to have higher probability of cognitive readiness than did children who had no one doing activities with them.

Regarding the effects of early childhood education and performing various activities with children on three- and four-year-olds, results indicate that four-year-olds had significantly higher (by 5.84 percent) probability of cognitive readiness than did three-year-olds. Overall, children who attended preschool tended to have a higher probability of cognitive readiness (by 21.7 percent) but a lower probability of social-emotional readiness (by 3.38 percent) than children who did not go to preschool.

Nevertheless, the binary probit estimation above does not consider the problem of endogeneity – children also might have self-selected to attend preschool. This issue may affect the estimation of the model and thus bias the results. Therefore, to prevent a biased estimation, we divided the analysis of children's development into two groups – three-year-olds and four-year-olds. Children begin to undergo early childhood education at the age of three, while variables relating to development measured data on four-year-olds, which is a one-way relationship. Development of children at the age of five reflects no impact from attending preschool when the children were three-year-olds.

Table 3.2 and Table 3.3 also presents an econometric estimation of variables affecting development of three- and four-year-olds using the binary probit model. Results show that children of both ages who received early childhood education had significantly higher probability of cognitive readiness than children who did not (by 14.7 percent for three-year-olds and 28.5 percent for four-year-olds). In addition, it was also found that four-year-olds receiving early childhood education had significantly higher (7.94 percent) probability of physical readiness than children who did not. But they were also more likely (by 4.37 percent) to suffer from social-emotional problems than were children who did not undergo early education.

Additionally, three-year-olds living with an ethnic Lao head of household had significantly higher probability (by 6.56 percent) of achieving learning readiness than three-year-olds living with a household head of other ethnic groups. However, such children were more likely to have physical and social-emotional problems (by 13.4 and 8.62 percent, respectively) at age four than were children living with a household head of other ethnic groups.

As for variables relating to parents or other household members doing activities with children, reading books to children or looking at picture books with

three-year-olds and naming/counting/drawing things with four-year-olds showed higher probability of promoting cognitive readiness than was found among children who had nobody doing these activities with them. And children with mothers who did activities with them at age four had a higher probability of increasing their cognitive skills, especially when mothers tell them stories, sing songs, and name/count/draw things with them than did children who had no one doing these kind of activities with them.

However, it was also found that when fathers or others took children outside the home, they were more likely to experience a negative impact on cognitive readiness than did children who were not taken outside. Even though fathers playing with children tended to lower children's cognitive skills, it had a positive impact on learning skills and physical skills. All in all, however, mothers doing activities with children had a higher probability of increasing social-emotional readiness when compared with fathers doing similar activities.

Table 3.1 Assessment of children's development outcomes of all children by socioeconomic variables (percent)

Variables	Cognitive readiness	Learning readiness	Physical readiness	Social-emotional readiness
Children's characteristic				
Children's Age				
Three years old	12.94	82.12	53.09	86.02
Four years old	22.71	81.13	52.62	86.15
Early Childhood Education				
Received	51.73	83.12	54.17	85.74
Not received	8.47	81.27	52.53	86.17
Gender				
Male	16.61	82.61	56.85	85.95
Female	18.65	80.57	48.38	86.23
Language spoken of household head				
Lao-Tai	19.82	85.98	51.30	86.21
Mon-Khmer	13.41	81.73	48.95	85.74
Hmong-Mien	20.78	77.13	57.69	89.03
Chinese-Tibetan	17.50	66.51	71.63	77.65
Ethnicity of household head				
Lao	19.83	86.99	48.81	85.04
Khmu	15.09	86.94	50.90	82.43
Hmong	21.35	76.83	57.94	89.05
Other	14.83	76.67	54.99	87.36
Family characteristic				
Residence				
Urban	40.70	83.33	52.87	88.14
Rural with road	14.03	81.58	52.93	85.94
Rural without road	5.39	79.71	52.54	83.94
Region				
North	16.35	79.89	59.58	85.11
Central	21.75	80.19	47.70	88.94
South	11.58	89.13	46.20	81.78
Mother's education attainment				
None	14.88	76.09	53.47	84.22
Primary	18.19	84.00	53.09	87.09
Secondary	19.44	87.18	51.87	89.16
Higher than secondary	30.28	92.96	48.59	82.61
Father's education attainment				
None	15.69	74.84	53.86	84.21
Primary	16.34	83.33	52.39	86.03
Secondary	19.32	84.57	53.27	87.21

Table 3.1 (Continued)

Father's education attainment				
Higher than secondary	22.76	78.86	52.37	86.80
Economic status of family				
Extremely poor	6.76	79.22	52.38	86.19
Poor	9.02	81.33	53.32	83.22
Middle	19.15	85.04	52.10	86.36
Wealthy	29.77	84.53	55.20	86.57
Extremely wealthy	52.93	82.01	51.99	90.38
Breast feeding				
Breastfed	17.39	81.71	53.01	86.31
Non-breastfed	25.71	78.87	46.48	76.39
Activity with children				
Read books to or look at picture books with children				
Mother	41.04	84.52	50.30	87.34
Father	35.73	81.79	50.36	85.21
Other	26.31	82.59	54.06	85.06
Nobody	15.42	79.00	53.60	84.33
Tell stories to children				
Mother	31.11	83.24	53.63	85.32
Father	24.85	80.09	52.80	83.71
Other	21.84	81.18	53.45	85.14
Nobody	17.20	78.06	50.42	87.27
Sing songs to children or with children, including lullabies (reference: Nobody)				
Mother	32.05	82.64	52.74	86.28
Father	25.66	80.00	51.15	84.01
Other	21.42	80.82	53.44	85.54
Nobody	15.27	78.04	51.65	86.80
Take children outside the home/compound/yard/enclosure (reference: Nobody)				
Mother	21.25	80.73	53.42	87.60
Father	21.35	80.06	52.63	85.37
Other	16.80	81.12	52.41	86.81
Nobody	15.86	79.04	53.98	85.34
Play with children (reference: Nobody)				
Mother	19.97	81.17	52.28	87.14
Father	19.40	82.88	53.26	85.70
Other	17.60	81.76	53.04	86.64
Nobody	17.93	77.38	52.26	86.67
Name/count/draw things to or with children (reference: Nobody)				
Mother	29.04	81.93	54.80	88.06
Father	27.74	80.99	54.07	85.16
Other	23.92	82.09	53.73	86.53
Nobody	15.52	79.90	51.24	83.41
Observations	3,302	3,352	3,344	3,132

Source: Authors' calculations from LSIS 2012

Table 3.2 Probit model (Marginal Effect) of an impact of early childhood education and activities with children on cognitive and learning readiness of three-year-olds, four-year-olds, and all children

Variables	Cognitive readiness			Learning readiness		
Age	3 years	4 years	Total	3 years	4 years	Total
Children characteristics						
Children Age (reference: three years old)						
Four	-	-	0.0584***	-	-	-0.0105
years old	-	-	(0.0124)	-	-	(0.0135)
Early Childhood Education (reference: Not Received)						
Received	0.147***	0.285***	0.217***	-0.0217	0.0249	0.00663
	(0.0318)	(0.0316)	(0.0229)	(0.0331)	(0.0264)	(0.0202)
Gender (reference: Male)						
Female	-0.00517	0.00786	0.00782	0.00971	0.00776	0.00909
	(0.0180)	(0.0285)	(0.0164)	(0.0255)	(0.0264)	(0.0184)
Language spoken of household head (reference: Hmong-Mien)						
Lao-Tai	0.917***	0.0274	0.0380	-0.0699	-0.0825	-0.0953
	(0.0239)	(0.120)	(0.0872)	(0.123)	(0.122)	(0.0876)
Mon-	0.951***	0.0148	0.0310	-0.0889	-0.140	-0.137
Khmer	(0.0170)	(0.119)	(0.0877)	(0.128)	(0.127)	(0.0921)
Chinese-	0.961***	0.0870	0.0929	-0.185	-0.242	-0.235*
Tibetan	(0.00428)	(0.152)	(0.119)	(0.168)	(0.168)	(0.120)
Ethnicity of household head (reference: Other)						
Lao	0.0166	-0.00864	0.00673	0.0656**	0.0442	0.0545**
	(0.0259)	(0.0387)	(0.0227)	(0.0314)	(0.0376)	(0.0242)
Khmu	0.0330	0.00789	0.0277	0.0826***	0.0925***	0.0896***
	(0.0327)	(0.0441)	(0.0275)	(0.0288)	(0.0286)	(0.0203)
Hmong	0.987***	0.0414	0.0813	-0.0569	-0.135	-0.116
	(0.00269)	(0.127)	(0.106)	(0.131)	(0.140)	(0.0994)
Family characteristic						
Residence (reference: Rural without road)						
Urban	0.0411	0.152**	0.0792**	0.00691	0.0193	0.0149
	(0.0410)	(0.0663)	(0.0372)	(0.0387)	(0.0431)	(0.0284)
Rural	0.0404*	0.0586	0.0471**	0.00252	0.0277	0.0113
with road	(0.0237)	(0.0361)	(0.0214)	(0.0293)	(0.0308)	(0.0211)

Table 3.2 (Continued)

Variables	Cognitive readiness			Learning readiness		
Age	3 years	4 years	Total	3 years	4 years	Total
Region (reference: South)						
North	-0.00762	-0.0233	-0.0119	-0.0483**	-0.0173	-0.0333**
	(0.0154)	(0.0246)	(0.0142)	(0.0230)	(0.0248)	(0.0168)
Central	0.0195	0.0255	0.0191	-0.072***	-0.0340	-0.0532***
	(0.0194)	(0.0296)	(0.0171)	(0.0272)	(0.0276)	(0.0194)
Mother's educational attainment (reference: Non-education)						
Primary	0.0355**	-0.00002	0.0184	0.0381*	0.0661***	0.0455***
	(0.0177)	(0.0252)	(0.0151)	(0.0217)	(0.0221)	(0.0155)
Secondary	0.00583	0.0662	0.0275	0.0570**	0.100***	0.0725***
	(0.0241)	(0.0425)	(0.0233)	(0.0267)	(0.0256)	(0.0192)
Higher than secondary	0.0357	0.160**	0.0805*	0.111***	0.133***	0.120***
	(0.0419)	(0.0762)	(0.0411)	(0.0297)	(0.0272)	(0.0212)
Father's educational attainment (reference: Non-education)						
Primary	0.0101	-0.0113	0.00117	0.0213	0.0429**	0.0284**
	(0.0138)	(0.0213)	(0.0124)	(0.0192)	(0.0202)	(0.0139)
Secondary	-0.00831	0.0257	0.00741	0.0167	-0.0172	0.00413
	(0.0156)	(0.0262)	(0.0149)	(0.0229)	(0.0257)	(0.0170)
Higher than secondary	0.000731	-0.0133	-0.00167	-0.00490	-0.0262	-0.0125
	(0.0227)	(0.0350)	(0.0207)	(0.0323)	(0.0371)	(0.0242)
Economic status (reference: Extremely poor)						
Poor	0.0182	-0.00592	0.00648	-0.0104	0.0339	0.0103
	(0.0219)	(0.0313)	(0.0188)	(0.0248)	(0.0242)	(0.0174)
Middle	0.0509*	0.0724*	0.0645***	0.0476*	0.0354	0.0449**
	(0.0275)	(0.0384)	(0.0235)	(0.0256)	(0.0284)	(0.0189)
Wealthy	0.0739**	0.0836*	0.0852***	-0.0127	0.0652**	0.0239
	(0.0338)	(0.0446)	(0.0280)	(0.0344)	(0.0306)	(0.0233)
Extremely wealthy	0.133***	0.147**	0.145***	0.00129	-0.00838	-0.00658
	(0.0474)	(0.0607)	(0.0380)	(0.0420)	(0.0496)	(0.0323)
Breast feeding (reference: Non-breastfed)						
Breastfed	0.0162	-0.119	-0.0254	0.0279	0.0480	0.0289
	(0.0347)	(0.0994)	(0.0440)	(0.0656)	(0.0830)	(0.0501)

Table 3.2 (Continued)

Variables	Cognitive readiness			Learning readiness		
Age	3 years	4 years	Total	3 years	4 years	Total
Activity with children						
Read books to or look at picture books with children (reference: Nobody)						
Mother	0.0641***	0.00396	0.0450**	0.0252	0.0347	0.0280
	(0.0243)	(0.0294)	(0.0191)	(0.0276)	(0.0301)	(0.0204)
Father	0.0575**	0.0353	0.0506**	-0.00995	-0.000794	-0.00203
	(0.0253)	(0.0315)	(0.0200)	(0.0304)	(0.0319)	(0.0218)
Other	0.0578**	0.0200	0.0475***	0.0257	0.0192	0.0239
	(0.0225)	(0.0285)	(0.0180)	(0.0248)	(0.0270)	(0.0182)
Tell stories to children (reference: Nobody)						
Mother	0.0125	0.0552*	0.0323*	0.0307	0.0156	0.0264
	(0.0183)	(0.0315)	(0.0176)	(0.0245)	(0.0287)	(0.0186)
Father	0.00365	0.00716	0.00954	-0.0385	-0.00457	-0.0214
	(0.0176)	(0.0283)	(0.0165)	(0.0282)	(0.0287)	(0.0200)
Other	0.00145	-0.0237	-0.00774	-0.0252	0.0195	-0.00369
	(0.0192)	(0.0260)	(0.0161)	(0.0280)	(0.0258)	(0.0190)
Sing songs to children or with children, including lullabies (reference: Nobody)						
Mother	0.0437**	0.0801**	0.0586***	-0.00824	0.0474*	0.0173
	(0.0204)	(0.0347)	(0.0191)	(0.0264)	(0.0276)	(0.0192)
Father	0.0236	0.0192	0.0183	-0.00701	-0.0579*	-0.0297
	(0.0206)	(0.0320)	(0.0183)	(0.0277)	(0.0339)	(0.0215)
Other	-0.00751	0.105***	0.0331*	-0.00184	-0.0419	-0.0207
	(0.0174)	(0.0309)	(0.0171)	(0.0249)	(0.0279)	(0.0186)
Take children outside the home/compound/yard/enclosure (reference: Nobody)						
Mother	0.0266*	-0.0596**	-0.00826	0.0240	-0.0532**	-0.0129
	(0.0159)	(0.0253)	(0.0145)	(0.0225)	(0.0236)	(0.0162)
Father	-0.0396***	-0.0560**	-0.0478***	-0.0275	-0.0168	-0.0256
	(0.0144)	(0.0251)	(0.0140)	(0.0252)	(0.0267)	(0.0184)
Other	-0.0300*	-0.0587**	-0.0430***	-0.0291	0.0219	-0.00384
	(0.0158)	(0.0258)	(0.0146)	(0.0242)	(0.0248)	(0.0172)
Play with children (reference: Nobody)						
Mother	-0.0383**	-0.0124	-0.0298**	-0.0252	-0.0143	-0.0195
	(0.0157)	(0.0271)	(0.0150)	(0.0247)	(0.0254)	(0.0177)
Father	-0.0223	-0.0613**	-0.0418***	0.0349	0.0782***	0.0547***
	(0.0169)	(0.0259)	(0.0150)	(0.0254)	(0.0242)	(0.0178)
Other	-0.0209	-0.0622**	-0.0398**	0.0505**	-0.0335	0.0109
	(0.0178)	(0.0296)	(0.0166)	(0.0252)	(0.0250)	(0.0178)

Table 3.2 (Continued)

Variables	Cognitive readiness			Learning readiness		
Age	3 years	4 years	Total	3 years	4 years	Total
Name/count/draw things to or with children (reference: Nobody)						
Mother	0.0118	0.0644**	0.0366**	-0.0224	0.00774	-0.00614
	(0.0178)	(0.0297)	(0.0168)	(0.0257)	(0.0277)	(0.0188)
Father	0.0137	0.0761**	0.0388**	-0.00980	0.00795	-0.00551
	(0.0198)	(0.0345)	(0.0191)	(0.0289)	(0.0301)	(0.0210)
Other	0.000277	0.0539*	0.0248	-0.0165	0.0142	-0.00249
	(0.0177)	(0.0307)	(0.0172)	(0.0253)	(0.0264)	(0.0182)
Children	1,739	1,563	3,302	1,762	1,590	3,352

Source: Authors' computation. Data from the Lao Social Indicator Survey (LSIS) 2011-2012

Note: *** p<0.01, ** p<0.05, * p<0.1; Standard errors in parentheses

Table 3.3 Probit model (Marginal Effect) of an impact of early childhood education and activities with children on physical and social-emotional readiness of three-year-olds, four-year-olds, and all children

Variables	Physical readiness			Social-emotional readiness		
Age	3 years	4 years	Total	3 years	4 years	Total
Children characteristics						
Children Age (reference: three years old)						
Four years old	-	-	-0.00949	-	-	0.00477
	-	-	(0.0179)	-	-	(0.0124)
Early Childhood Education (reference: Not Received)						
Received	-0.0103	0.0794**	0.0378	-0.0219	-0.0437*	-0.0338*
	(0.0419)	(0.0352)	(0.0265)	(0.0309)	(0.0260)	(0.0200)
Gender (reference: Male)						
Female	0.00284	0.0917*	0.0420	-0.0356	-0.00444	-0.0194
	(0.0445)	(0.0478)	(0.0322)	(0.0314)	(0.0327)	(0.0227)
Language spoken of household head (reference: Hmong-Mien)						
Lao-Tai	0.125	0.104	0.0815	-0.0515	0.0407	-0.00764
	(0.157)	(0.143)	(0.105)	(0.125)	(0.126)	(0.0889)
Mon-Khmer	0.102	-0.0230	0.0199	0.0419	0.0368	0.0409
	(0.156)	(0.144)	(0.105)	(0.112)	(0.121)	(0.0820)
Chinese-Tibetan	0.240*	0.152	0.172*	-0.0779	-0.174	-0.124
	(0.130)	(0.134)	(0.0956)	(0.160)	(0.211)	(0.129)
Ethnicity of household head (reference: Other)						
Lao	-0.0272	-0.134**	-0.0642*	-0.0391	-0.0862*	-0.0595**
	(0.0478)	(0.0530)	(0.0351)	(0.0361)	(0.0478)	(0.0286)
Khmu	-0.0618	-0.0410	-0.0524	-0.185***	-0.0925*	-0.138***
	(0.0520)	(0.0542)	(0.0371)	(0.0560)	(0.0498)	(0.0374)
Hmong	0.131	0.0783	0.0819	-0.0160	-0.0104	-0.0132
	(0.149)	(0.137)	(0.101)	(0.125)	(0.132)	(0.0903)
Family characteristic						
Residence (reference: Rural without road)						
Urban	0.0271	-0.0994*	-0.0273	0.0138	0.0167	0.0194
	(0.0529)	(0.0601)	(0.0394)	(0.0342)	(0.0381)	(0.0250)
Rural with road	0.0144	-0.0726*	-0.0248	0.0384	0.00811	0.0264
	(0.0394)	(0.0414)	(0.0283)	(0.0282)	(0.0278)	(0.0200)
Region (reference: South)						
North	0.0933	0.209***	0.149***	0.0615	0.0741*	0.0682**
	(0.0640)	(0.0642)	(0.0449)	(0.0426)	(0.0439)	(0.0307)
Central	0.00740	-0.0137	0.00360	0.112***	0.0782***	0.0982***
	(0.0446)	(0.0460)	(0.0317)	(0.0267)	(0.0279)	(0.0193)

Table 3.3 (Continued)

Variables	Physical readiness			Social-emotional readiness		
Age	3 years	4 years	Total	3 years	4 years	Total
Mother's educational attainment (reference: Non-education)						
Primary	0.0123	0.0352	0.0227	0.0392**	0.0303	0.0365**
	(0.0306)	(0.0318)	(0.0218)	(0.0198)	(0.0211)	(0.0145)
Secondary	0.0233	0.0357	0.0283	0.0598***	0.0252	0.0498***
	(0.0420)	(0.0476)	(0.0311)	(0.0228)	(0.0291)	(0.0177)
Higher than secondary	-0.0624	0.0595	-0.0107	-0.0295	0.0106	-0.0136
	(0.0649)	(0.0704)	(0.0477)	(0.0456)	(0.0443)	(0.0324)
Father's educational attainment (reference: Non-education)						
Primary	0.0183	-0.0495*	-0.0127	0.0140	-0.000804	0.00604
	(0.0257)	(0.0271)	(0.0185)	(0.0176)	(0.0183)	(0.0128)
Secondary	-0.0246	0.0582*	0.0107	0.00266	-0.00692	-0.00380
	(0.0309)	(0.0321)	(0.0220)	(0.0212)	(0.0223)	(0.0155)
Higher than secondary	0.0431	-0.0667	-0.0037	-0.00152	0.00249	-0.000785
	(0.0428)	(0.0469)	(0.0316)	(0.0298)	(0.0314)	(0.0219)
Economic status (reference: Extremely poor)						
Poor	0.0374	-0.0310	0.0106	-0.0190	-0.0379	-0.0259
	(0.0328)	(0.0358)	(0.0240)	(0.0234)	(0.0259)	(0.0173)
Middle	0.0110	-0.0560	-0.0149	0.0107	0.000470	0.00447
	(0.0379)	(0.0413)	(0.0277)	(0.0254)	(0.0278)	(0.0189)
Wealthy	0.114***	-0.0588	0.0299	0.0212	0.00743	0.0103
	(0.0426)	(0.0487)	(0.0322)	(0.0278)	(0.0316)	(0.0214)
Extremely wealthy	-0.0122	0.0147	-0.0005	0.0336	0.0778***	0.0556**
	(0.0555)	(0.0618)	(0.0407)	(0.0332)	(0.0280)	(0.0221)
Breast feeding (reference: Non-breastfed)						
Breastfed	-0.0168	0.193**	0.0605	0.0447	0.139	0.0877*
	(0.0790)	(0.0948)	(0.0609)	(0.0573)	(0.0872)	(0.0495)
Activity with children						
Read books to or look at picture books with children (reference: Nobody)						
Mother	-0.0692*	-0.0227	-0.0544*	-0.00727	0.0129	0.00197
	(0.0393)	(0.0424)	(0.0284)	(0.0277)	(0.0281)	(0.0197)
Father	-0.0508	-0.0244	-0.0282	-0.00550	0.00445	0.000722
	(0.0411)	(0.0419)	(0.0290)	(0.0282)	(0.0279)	(0.0198)
Other	0.00853	0.0167	0.00888	-0.0397	-0.00955	-0.0239
	(0.0349)	(0.0372)	(0.0251)	(0.0259)	(0.0257)	(0.0182)

Table 3.3 (Continued)

Variables	Physical readiness			Social-emotional readiness		
Age	3 years	4 years	Total	3 years	4 years	Total
Tell stories to children (reference: Nobody)						
Mother	0.0335	-0.0162	0.0151	-0.0172	-0.0229	-0.0184
	(0.0356)	(0.0391)	(0.0259)	(0.0258)	(0.0283)	(0.0189)
Father	0.00742	-0.0125	0.00026	0.00164	-0.0409	-0.0184
	(0.0357)	(0.0378)	(0.0256)	(0.0240)	(0.0279)	(0.0182)
Other	0.00667	-0.0333	-0.0144	0.0160	-0.0322	-0.00945
	(0.0363)	(0.0356)	(0.0251)	(0.0237)	(0.0255)	(0.0176)
Sing songs to children or with children, including lullabies (reference: Nobody)						
Mother	0.00755	-0.0163	0.00125	-0.00681	-0.0217	-0.0134
	(0.0357)	(0.0403)	(0.0264)	(0.0253)	(0.0291)	(0.0191)
Father	-0.0752**	0.0469	-0.0269	0.0163	-0.0549*	-0.0198
	(0.0377)	(0.0405)	(0.0274)	(0.0244)	(0.0316)	(0.0197)
Other	-0.00139	-0.0057	-0.0021	-0.0220	-0.0129	-0.0177
	(0.0334)	(0.0361)	(0.0242)	(0.0238)	(0.0250)	(0.0172)
Take children outside the home/compound/yard/enclosure (reference: Nobody)						
Mother	0.00997	0.0249	0.0139	0.0164	0.0374*	0.0249*
	(0.0300)	(0.0318)	(0.0215)	(0.0203)	(0.0218)	(0.0148)
Father	-0.0156	-0.0324	-0.0217	0.0136	-0.0564**	-0.0163
	(0.0333)	(0.0357)	(0.0241)	(0.0222)	(0.0276)	(0.0173)
Other	-0.0293	-0.0109	-0.0176	0.0179	0.00584	0.0113
	(0.0313)	(0.0338)	(0.0227)	(0.0210)	(0.0229)	(0.0155)
Play with children (reference: Nobody)						
Mother	-0.000765	-0.0501	-0.0255	0.0148	0.000254	0.00632
	(0.0329)	(0.0341)	(0.0234)	(0.0220)	(0.0234)	(0.0160)
Father	-0.0303	0.0706*	0.0145	-0.00649	0.0185	0.00421
	(0.0364)	(0.0375)	(0.0260)	(0.0249)	(0.0248)	(0.0177)
Other	0.0170	0.00734	0.00901	0.000795	0.0182	0.0109
	(0.0321)	(0.0343)	(0.0232)	(0.0215)	(0.0235)	(0.0159)
Name/count/draw things to or with children (reference: Nobody)						
Mother	0.00944	0.0485	0.0324	0.0448**	0.0312	0.0391**
	(0.0339)	(0.0367)	(0.0246)	(0.0217)	(0.0239)	(0.0161)
Father	0.0367	-0.0069	0.0152	-0.0770**	0.0291	-0.0196
	(0.0385)	(0.0410)	(0.0277)	(0.0317)	(0.0254)	(0.0201)
Other	0.00155	0.0417	0.0174	0.0231	0.00974	0.0174
	(0.0329)	(0.0362)	(0.0241)	(0.0217)	(0.0246)	(0.0163)
Children	1,761	1,583	3,344	1,652	1,480	3,132

Source: Authors' computation. Data from the Lao Social Indicator Survey (LSIS) 2011-2012

Note: *** p<0.01, ** p<0.05, * p<0.1; Standard errors in parentheses

CHAPTER 4

CONCLUSION AND POLICY RECOMMENDATION

This study examines the impact of socioeconomic factors on the accessibility of early childhood education and child development outcomes in Lao PDR, a least developed country. Our estimation has shown that children who live in municipal areas had a higher probability of attending preschool than did those living in rural areas without roads. Interestingly, mothers' educational attainment was found to have a greater impact on students' probability of attending preschool than did fathers'. In addition, a family's economic status was observed to have an important impact on their children's preschool enrollment. Children from high-income families had a higher probability of attending preschool than did children from extremely low-income families.

Our investigation of children's development outcomes in Laos reveals that four-year-olds had a higher probability of attaining cognitive readiness than did three-year-olds. Results indicate that children who participated in early childhood education were likely to have significantly higher cognitive readiness than children who did not participate in early childhood education whether early or later but that they faced social-emotional problems when they reached age four. Regarding parents' educational attainment, we find that children living with mothers who were educated tended to have higher cognitive and learning readiness than children living with mothers who were relatively uneducated.

Results also indicate that children from high-income families had a higher probability of achieving cognitive readiness than children from extremely poor families. Especially, children from extremely wealthy families were likely to have greater social-emotional readiness than were children from extremely poor families. Furthermore, activities done together between parents and children also play an important role in their children's development.

Since socioeconomic factors influence children's preschool enrollment in Lao PDR, which serves here as a case study of a least-developed country, the government

should promote early childhood educational opportunities for disadvantaged children in order to reduce the gap in access to early education between urban and rural children. Besides overall support for early childhood education, preschool quality in terms of curriculum and personnel is also a considerable issue that affects children's development. Thus, investing in early childhood education should be considered an economic and social development policy for strengthening employment productivity that will benefit the country in the long term.

Our data are limited by the fact that there is no information on preschool quality and also no separate data on public and private preschools, which would allow for exploration of the impact of different levels of quality and types of early childhood education on children's development. Moreover, this investigation would require panel data for each individual in order to assess the long-term benefits of early childhood education, which would generate useful information for researchers as they craft appropriate recommendations for early childhood education policy.

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APPENDICES

Appendix A

Household Questionnaire

Lao Social Indicator Survey
LSIS (MICS/DHS)

Household Information Panel	**HH**
HH1. Cluster number _____	HH2. Household number _____
HH3. Interviewer name and number: Name _____	HH4. Supervisor name and number: Name _____
HH5. Day / Month / Year of interview	_____/_____/_____
HH6. Area: Urban……..1 Rural with road……...2 Rural without road……..3	HH7. Province Name & Code: _____
HH7A. Is household selected for male interview? 1. Yes 2. No	

01 Vientiane capital	05 Bokeo	09 Xiengkhuang	13 Savannakhet
02 Phongsaly	06 Luangprabang	10 Vientiane	14 Saravane
03 Luangnamtha	07 Huaphanh	11 Borkhamxay	15 Sekong
04 Oudomxay	08 Xayabury	12 Khammua	16 Champasack
			17 Attapeu

After all questionnaires for the household have been completed. Fill in the following information:	
HH8. Name of head of household:	
HH9. Result of household interview: Completed……....01 No household member or no competent Respondent at home at time of visit…….....02 Entire household absent for extended Period of time……...03 Refused……..…04 Dwelling vacant / Address not a dwelling…05 Dwelling destroyed……...06 Dwelling not found……...07 Other (Specify)…….96	HH10. Respondent to household questionnaire: Name: Line Number:
HH12. Number of women age 15-49 years:	HH11. Total number of household members:
HH14. Number of children under age 5:	HH13. Number of woman's questionnaires completed:

HH18. *Record the time.*

Hour __ __

Minutes __ __

HOUSEHOLD LISTING FORM — HL

FIRST, PLEASE TELL ME THE NAME OF EACH PERSON WHO USUALLY LIVES HERE, STARTING WITH THE HEAD OF THE HOUSEHOLD.
List the head of the household in line 01. List all household members (HL2), their relationship to the household head (HL3), and their sex (HL4)
Then ask: ARE THERE ANY OTHERS WHO LIVE HERE, EVEN IF THEY ARE NOT AT HOME NOW?
If yes, complete listing for questions HL2-HL4. Then, ask questions starting with HL5 for each person at a time.
Use an additional questionnaire if all rows in the household listing form have been used.

	For age 15 and above	*For women age 15-49*	*For men age 15-49*	*For children age 5-14*	*For children under age 5*	*For children age 0-17 years*

HL1. *Line Number*	HL2. *Name*	HL3. WHAT IS THE RELATIONSHIP OF (*name*) TO THE HEAD OF HOUSEHOLD?	HL4. IS (*name*) MALE OR FEMALE? 1 Male 2 Female		HL10. DID (*name*) STAY HERE LAST NIGHT? 1 Yes 2 No	HL5. WHAT IS (*name*)'S DATE OF BIRTH? 98 DK 9998 DK		HL6. HOW OLD IS (*name*)? *Record in completed years. If age is 95 or above, record '95'*	HL6A WHAT IS MARITAL (*name*)'S STATUS 1 Never Married 2 Married 3 Divorced 4 Widowed 5. Separated	HL7. *Circle line number if woman is age* **15-49**	HL7A. *In HHs selected for male interview, circle line number if man is age 15-49*	HL8. WHO IS THE MOTHER OR PRIMARY CARETAKER OF THIS CHILD? *Record line number of mother/ caretaker*	HL9. WHO IS THE MOTHER OR PRIMARY CARETAKER OF THIS CHILD? *Record line number of mother/ caretaker*	HL11. IS (*name*)'S NATURAL MOTHER ALIVE? 1 Yes 2 No → HL13 8 DK → HL13	HL12. DOES (*name*)'S NATURAL MOTHER LIVE IN THIS HOUSEHOLD? *Record line number of mother or 00 for "No"*	HL13. IS (*name*)'S NATURAL FATHER ALIVE? 1 Yes 2 No → Next Line 8 DK → Next Line	HL14. DOES (*name*)'S NATURAL FATHER LIVE IN THIS HOUSEHOLD? *Record line number of father or 00 for "No"*
Line	Name	Relation*	M	F	Y N	Month	Year	Age		15 - 49	15-49	Mother	Mother	Y N DK	Mother	Y N DK	Father
01		0 1	1	2	1 2	__ __	__ __ __ __	__ __	___	01	01	__ __	__ __	1 2 8	__ __	1 2 8	__ __
02		___ ___	1	2	1 2	__ __	__ __ __ __	__ __	___	02	02	__ __	__ __	1 2 8	__ __	1 2 8	__ __
03		___ ___	1	2	1 2	__ __	__ __ __ __	__ __	___	03	03	__ __	__ __	1 2 8	__ __	1 2 8	__ __
04		___ ___	1	2	1 2	__ __	__ __ __ __	__ __	___	04	04	__ __	__ __	1 2 8	__ __	1 2 8	__ __
05		___ ___	1	2	1 2	__ __	__ __ __ __	__ __	___	05	05	__ __	__ __	1 2 8	__ __	1 2 8	__ __
06		___ ___	1	2	1 2	__ __	__ __ __ __	__ __	___	06	06	__ __	__ __	1 2 8	__ __	1 2 8	__ __
07		___ ___	1	2	1 2	__ __	__ __ __ __	__ __	___	07	07	__ __	__ __	1 2 8	__ __	1 2 8	__ __
08		___ ___	1	2	1 2	__ __	__ __ __ __	__ __	___	08	08	__ __	__ __	1 2 8	__ __	1 2 8	__ __
09		___ ___	1	2	1 2	__ __	__ __ __ __	__ __	___	09	09	__ __	__ __	1 2 8	__ __	1 2 8	___ ___

HL1. *Line Number*	HL2. *Name*	HL3. WHAT IS THE RELATIONSHIP OF (*name*) TO THE HEAD OF HOUSEHOLD?	HL4. IS (*name*) MALE OR FEMALE? 1 Male 2 Female		HL10. DID (*name*) STAY HERE LAST NIGHT? 1 Yes 2 No	HL5. WHAT IS (*name*)'S DATE OF BIRTH? 98 DK 9998 DK		HL6. HOW OLD IS (*name*)? *Record in completed years. If age is 95 or above, record '95'*	HL6A WHAT IS MARITAL (*name*)'S STATUS 1 Never Married 2 Married 3 Divorced 4 Widowed 5. Separated	HL7. *Circle line number if woman is age* **15-49**	HL7A. *In HHs selected for male interview, circle line number if man is age 15-49*	HL8. WHO IS THE MOTHER OR PRIMARY CARETAKER OF THIS CHILD? *Record line number of mother/ caretaker*	HL9. WHO IS THE MOTHER OR PRIMARY CARETAKER OF THIS CHILD? *Record line number of mother/ caretaker*	HL11. IS (*name*)'S NATURAL MOTHER ALIVE? 1 Yes 2 No ↘ HL13 8 DK ↘ HL13	HL12. DOES (*name*)'S NATURAL MOTHER LIVE IN THIS HOUSEHOLD? *Record line number of mother or 00 for "No"*	HL13. IS (*name*)'S NATURAL FATHER ALIVE? 1 Yes 2 No ↘ Next Line 8 DK ↘ Next Line	HL14. DOES (*name*)'S NATURAL FATHER LIVE IN THIS HOUSEHOLD? *Record line number of father or 00 for "No"*
Line	Name	Relation*	M	F	Y N	Month	Year	Age		15 - 49	15-49	Mother	Mother	Y N DK	Mother	Y N DK	Father
10		__ __	1	2	1 2	__ __	__ __ __ __	__ __	__	10	10	__ __	__ __	1 2 8	__ __	1 2 8	__ __
11		__ __	1	2	1 2	__ __	__ __ __ __	__ __	__	11	11	__ __	__ __	1 2 8	__ __	1 2 8	__ __
12		__ __	1	2	1 2	__ __	__ __ __ __	__ __	__	12	12	__ __	__ __	1 2 8	__ __	1 2 8	__ __
13		__ __	1	2	1 2	__ __	__ __ __ __	__ __	__	13	13	__ __	__ __	1 2 8	__ __	1 2 8	__ __
14		__ __	1	2	1 2	__ __	__ __ __ __	__ __	__	14	14	__ __	__ __	1 2 8	__ __	1 2 8	__ __
15			1	2	1 2					15	15			1 2 8		1 2 8	

Tick here if additional questionnaire used ☐

Probe for additional household members.
Probe especially for any infants or small children not listed, and others who may not be members of the family (such as servants, friends) but who usually live in the household. Insert names of additional members in the household list and complete form accordingly.

Return to Household Information Panel and complete HH10, HH11, HH12, HH14, and HH15A.
Now for each woman age 15-49 years, complete the information panel of a separate Woman's Questionnaire.
In households selected for male interview, for each man age 15-49 years complete the information panel of a separate Man's Questionnaire.
For each child under age 5, write his/her name and line number AND the line number of his/her mother or caretaker in the information panel of a separate Under-5 Questionnaire.
You should now have a separate questionnaire for each eligible woman, man and each child under five in the household.

* Codes for HL3: Relationship to head of household:

01 Head	05 Grandchild	09 Brother-In-Law / Sister-In-Law	13 Adopted / Foster / Stepchild
02 Wife / Husband	06 Parent	10 Uncle / Aunt	14 Not related
03 Son / Daughter	07 Parent-In-Law	11 Niece / Nephew	98 Don't know
04 Son-In-Law / Daughter-In-Law	08 Brother / Sister	12 Other relative	

Household characteristics		**HC**
HC1A. What is the religion of the head of this household?	Buddhist……………………………..1 Christianity……………………………..2 Islam……………………………………3 Animist…………………………………4 Other religion (specify) _____________6 No religion……………………………......7	
HC1C. To what ethnic group does the head of this household belong?	Ethnic Group ( ) Code Other ethnic group (specify) ________96	
HC2. How many rooms in this household are used for sleeping?	Number of rooms………………………..	
HC3. Main material of the dwelling floor. Record observation. HC4. Main material of the roof. Record observation.	Natural floor Earth/sand……………………………..11 Dung…………………………………..12 Rudimentary floor Wood planks…………………………..21 Palm / Bamboo……………………….22 Finished floor Parquet or polished wood……………31 Vinyl or asphalt strips………………...32 Ceramic tiles…………………………33 Cement………………………………..34 Carpet…………………………………35 Other (specify)____________________96 Natural roofing No roof……………………………….11 Thatch / Palm leaf…………....………12 Rudimentary Roofing Palm / Bamboo………………………..22 Wood planks…………………………23 Finished roofing Metal…………………………………31 Wood………………………………….32 Calamine / cement fibre………………33 Ceramic tiles…………………………34 Cement………………………………..35 Roofing shingles……………………...36 Other (specify)___________________96 Natural walls	

HC5. Main material of the exterior walls. Record observation.	No walls……..……11 Cane / Palm / Trunks……12 Dirt……13 Rudimentary walls Bamboo with mud……21 Plywood……24 Cardboard……..25 Reused wood……26 Bamboo mat……..27 Bamboo/Bamboo with dry leaf…….28 Bamboo lattice……..29 Finished walls Cement……..31 Stone with lime / cement……..32 Bricks……33 Cement blocks……..34 Wood planks / shingles……36 Other (specify)_____96	
HC6. What type of fuel does your household mainly use for cooking?	Electricity……..…..01 Liquefied Petroleum Gas (LPG)…..…...02 Natural gas…….……03 Biogas…….……...04 Kerosene…….……...05 Coal / Lignite…….……....06 Charcoal…….……07 Wood…….……08 Straw / Shrubs / Grass…….……...09 Animal dung…….……..10 Agricultural crop residue…..……...11 No food cooked in household……95 Other (specify)_____96	01→HC8 02→HC8 03→HC8 04→HC8 05→HC8 95→HC8
HC7. Is the cooking usually done in the house, in a separate building, or outdoors? If ‘In the house’, probe: is it done in a separate room used as a kitchen?	In the house In a separate room used as kitchen……..1 Elsewhere in the house……....2 In a separate building…….....3 Outdoors……..4 Other (specify)_____6	

HC8. Does your household have: [A] Electricity? [B] A radio? [C] A television? [D] A non-mobile telephone? [E] A refrigerator? [F] A clock? [G] Fan? [H] Sofa / Wooden settee? [I] Water pump? [J] Air-conditioner? [K] Washing machine? [L] CD/DVD Player?	Yes No Electricity……1 2 Radio……1 2 Television…….....1 2 Non-mobile telephone…….....1 2 Refrigerator……..1 2 Clock…….....1 2 Fan……1 2 Sofa / Wooden settee……....1 2 Water pump…….....1 2 Air conditioner……..1 2 Washing Machine…….……1 2 CD/DVD player…….…….....1 2	
HC9. Does any member of your household own: [A] A watch? [B] A mobile telephone? [C] A bicycle? [D] A motorcycle or scooter? [E] An animal-drawn cart? [F] A car or truck? [G] A boat with a motor? [H] Tuk Tuk [I] Tak Tak? [J] Camera? [K] Computer?	Yes No Watch…….....1 2 Mobile phone…….....1 2 Bicycle…….....1 2 Motorcycle/Scooter……1 2 Animal drawn-cart……..1 2 Car/Truck……...1 2 Boat with motor…….....1 2 Tuk tuk……...1 2 Tak Tak……..1 2 Camera……...1 2 Computer……...1 2	
HC10. Do you or any member of this household own this dwelling? If "No", then ask: Do you rent this dwelling from someone not living in this household? If "Rented from someone else", circle "2". For other responses, circle "6".	Own……..1 Rent……..2 Other (Not owned or rented)……6	
HC11. Does any member of this household own any land that can be used for agriculture?	Yes……1 No…….2	2→HC13

HC12. How many hectares of agricultural land do members of this household own? If less than 1, record "00". If 95 or more, record '95'. If unknown, record '98'.	Hectares……..	
HC13. Does this household own any livestock, herds, other far animals, or poultry?	Yes……1 No…….2	2→HC15
HC14. How many of the following animals does this household have? [A] Bulls? [B] Buffalo? [C] Goats? [D] Sheep? [E] Poultry? [F] Pigs? [G] Horses, Donkeys, or Mules If none, record '00' If 95 or more, record '95' If unknown, record '98'	 Bulls……... Buffalo…… Goats……... Goals……... Poultry…… Pigs…… Horses/Donkeys/Mules……..	
HC15. Does any member of this household have a bank account?	Yes……1 No…….2	

Appendix B

Children Under Five Questionnaire

Lao Social Indicator Survey

LSIS (MICS/DHS)

Under-five Child Information Panel	**UF**
This questionnaire is to be administered to all mothers or caretakers (see Household Listing form, column HL9) who care for a child that lives with them and is under the age of 5 years (see Household Listing Form, column HL6). A separate questionnaire should be used for each eligible child	
UF1. Cluster number:	UF2. Household number:
UF3. Child's name: Name	UF4. Child's line number:
UF5. Mother's / caretaker's name Name	UF6. Mother's / caretaker's line number:
UF.7 Interviewer name and number: Name	UF8. Day / Month / Year of interview: / /

May I start now?

□ Yes, permission is given → Go to UF12 to record the time and then begin the interview

□ No, permission is not given → Complete UF9. Discuss the result with your supervisor

UF9. Result of interview for children under 5 Codes refer to mother/caretaker	Completed…….01 Not at home……...……...02 Refused…….03 Partly completed……...04 Incapacitated…….05 Other (specify)_____96
UF10. Field edited by (Name and number): Name_____	UF11. Data entry clerk (Name and number): Name:_____
UF12. Record the time	Hour and minutes……

AGE		**AG**
AG1. Now I would like to ask you some questions about the health of (name) In what month and year was (name) born? Probe: What is his/her birthday? If the mother/caretaker knows the exact birth date, also enter the day: otherwise, circle 98 for day Month and year must be recorded	Date of birth Day……... DK day……98 Month……... Year……..	
AG2. How old is (name)? Probe: How old was (name) at his/her last birthday? Record age in completed years Record '0' if less than 1 year Compare and correct AG1 and/or AG2 if inconsistent	Age (in completed years)….	

Birth registration		**BR**
BR1. Does (name) have a birth certificate? If yes, ask: May I see it?	Yes, seen……..…1 Yes, not seen…….…...2 No……..…3 DK…….…...8	1→Next Module 2→Next Module
BR2. Has (name)'s birth been registered with the civil authorities?	Yes…….…...1 No……..…2 DK…….…...8	1→Next Module
BR3. Do you know how to register your child's birth?	Yes……...1 No……..…2	

Early childhood development		**EC**
EC1. How many children's books or picture books do you have for (name)?	None……..00 Number of children's books Ten or more books……10	
EC2. I am interested in learning about the things that (name) plays with when he/she is at home Does he/she play with: [A] Homemade toys (such as dolls, cars, or other toys made at home)? [B] Toys from a shop or manufactured toys? [C] Household objects (such as bowls or pots) or objects found outside (such as sticks, rocks, animal shells or leaves)? If the respondent says "YES" to the categories above, then probe to learn specifically what the child plays with to ascertain the response	Y N DK Homemade toys…1 2 8 Toys from a shop..1 2 8 Household objects or outside objects..1 2 8	
EC3. Sometimes adults taking care of children have to leave the house to go shopping, wash clothes, or for other reasons and have to leave young children On how many days in the past week was (name): [A] Left alone for more than an hour? [B] Left in the care of another child, that is, someone less than 10 years old, for more than an hour? If 'none' enter '0'. If 'don't know' enter 's'	Number of days left alone for more than an hour……... Number of days left with other child for more than an hour……...	
EC4. Check AG2: Age of child □ Child age 3 or 4 → continue with EC5 □ Child age 0, 1 or 2 → go to next module		

EC5. Does (name) attended any organized learning or early childhood education programme, such as a private or government faculty, including kindergarten or community child care?	Yes……1 No……..2 DK…….8	 2→EC7 8→EC7
EC6. Within the last seven days, about how many hours did (name) attend?	Number of hours…….	
EC7. In the past 3 days, did you or any household member over 15 years of age engage in any of the following activities with (name): If yes, ask: Who engaged in this activity with (name)? Circle all that apply. [A] Read books to or looked at picture books with (name)? [B] Told stories to (name)? [C] Sang songs to (name) or with (name), including lullabies? [D] Took (name) outside the home, compound, yard or enclosure? [E] Played with (name)? [F] Named, counted, or drew things to or with (name)?	Mother Father Other No One A B X Y A B X Y A B X Y A B X Y A B X Y A B X Y	
EC8. I would like to ask you some questions about the health and development of your child. Children do not all develop and learn at the same rate. For example, some walk earlier than others. These questions are related to several aspects of your child's development. Can (name) identify or name at least ten letters of the alphabet?	Yes……..…1 No……...2 DK……..8	

EC9. Can (name) read at least four simple, popular words?	Yes……1 No……...2 DK……..8	
EC10. Does (name) know the name and recognize the symbol of all numbers from 1 to 10?	Yes……1 No……...2 DK……..8	
EC11. Can (name) pick up a small object with two fingers, like a stick or a rock from the ground?	Yes……1 No……...2 DK……..8	
EC12. Is (name) sometimes too sick to play?	Yes……1 No……...2 DK……..8	
EC13. Does (name) follow simple directions on how to do something correctly?	Yes……1 No……...2 DK……..8	
EC14. When given something to do, is (name) able to do it independently?	Yes……1 No……...2 DK……..8	
EC15. Does (name) get along well with other children?	Yes……1 No……...2 DK……..8	
EC16. Does (name) kick, bite, or hit other children or adults?	Yes……1 No……...2 DK……..8	
EC17. Does (name) get distracted easily?	Yes……1 No……...2 DK……..8	

Breastfeeding		**BF**
BF1. Has (name) ever been breastfed?	Yes……1 No……2 DK……8	 2→BF3 8→BF3
BF2. Is he/she still being breastfed?	Yes……1 No……2 DK……8	
BF3. I would like to ask you about liquids that (name) may have had yesterday during the day or the night. I am interested in whether (name) had the item even if it was combined with other foods Did (name) drink plain water yesterday, during the day or night?	 Yes……1 No……2 DK……8	
BF4. Did (name) drink infant formula yesterday, during the day or night?	Yes……1 No……2 DK……8	 2→BF6 8→BF6
BF5. How many times did (name) drink infant formula?	Number of times……	
BF6. Did (name) drink milk, such as tinned, powdered or fresh animal milk yesterday, during the day or night?	Yes……1 No……2 DK……8	 2→BF8 8→BF8
BF7. How many times did (name) drink tinned, powdered or fresh animal milk?	Number of times……	
BF8. Did (name) drink juice or juice drinks yesterday, during the day or night?	Yes……1 No……2 DK……8	
BF9. Did (name) drink clear broth/soup (Namkaeng) yesterday, during the day or night?	Yes……1 No……2 DK……8	
BF10. Did (name) drink or eat vitamin or mineral supplements or any medicines yesterday, during the day or night?	Yes……1 No……2 DK……8	
BF11. Did (name) drink ORS (oral list/Nam Tha Lay Phoun) yesterday, during the day or night?	Yes……1 No……2 DK……8	
BF12. Did (name) drink any other liquids yesterday, during the day or night?	Yes……1 No……2 DK……8	

BF13. Did (name) drink or eat yogurt yesterday, during the day or night?	Yes……1 No……...2 DK……..8	
BF14. How many times did (name) drink or eat yogurt yesterday, during the day or night?	Number of times……...	
BF15. Did (name) eat thin porridge yesterday, during the day or night?	Yes……1 No……...2 DK……..8	
BF16. Did (name) eat solid or semi-solid (soft, mushy) food yesterday, during the day or night?	Yes……1 No……...2 DK……..8	
BF17. How many times did (name) eat solid or semi-solid (soft, mushy) food yesterday, during the day or night?	Yes……1 No……...2 DK……..8	
BF18. Yesterday, during the day or night. Did (name) drink anything from a bottle with a nipple?	Yes……1 No……...2 DK……..8	

BIOGRAPHY

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EXPERIENCES	Bachelor's degree with a major Planning and Development Economics from The Faculty of Economics and Business Management at National University of Laos, Vientiane capital, Lao People Democratic Republic (2011-2015)