

# Return to education and labor market in Cambodia: evidence from labor force survey 2012 and CSES 2014

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**Abstract.** This paper mainly estimates the returns to education employing the standard Mincerian function using the latest Cambodian labor force survey 2012, where the dependent variable is the natural logarithm of earnings and independent variables include years of schooling or educational attainment and potential experience. The paper also examines the effect of foreign language skills on earnings. This paper is divided into three sections. The first section examines Cambodia's labor markets. The second section explores the econometric model, in particular, Mincerian function to estimate returns to education using the latest labor force survey conducted in 2012. We find that for employed persons with an educational level lower than or equal to grade 12 it is about 3.3 percent; but it is higher for males. The annualized rate of return to education for undergraduate level was approximately 17 percent. Regarding language skill, we find that people who hold a bachelor degree and can speak English can earn more than those who can speak only Khmer language. There is also a significant wage gap between bachelor holders and high school certificate holders at a ratio of 1.9.

**Keywords:** Returns to education, Mincerian function, labor market, human capital.

## INTRODUCTION

Cambodia has made significant progress in implementing the "Education for All" strategy, which ensures equity of access to primary and basic nine-year education for Cambodian children. Other major achievements include the gradual increase in the number of schools and teachers and improved enrolment rates at the primary and secondary school levels, particularly in rural areas. However, the majority of Cambodia labor force has low education levels.

The adult literacy rate in Cambodia has been improved over the past 10 years. The adult literacy rate (the share of the population aged 15 years and above who can both read and write a simple message in any language) was estimated at 78% for both sexes combined, and 72 and 85% for women and men, respectively in 2014. The adult literacy rate has increased by about 9 percentage points since 2004. The increase was higher for women than for

men but the differences are small.

Education services in Cambodia have been provided by both the public and private sectors at all level of education. The Cambodian education system includes pre-school, primary, lower secondary, upper secondary, higher education and non-formal education (Annex I). There are both public and private schools at all levels of education. The increase in population and speedy urbanization, as well as the quest for higher standard education, are some factors for the fast development of private schools in Cambodia. About 3 million students were enrolled in public pre-school, primary, lower secondary and upper secondary in 2014. At the higher education level, the majority of students attended private schools while at lower education levels, most of the students go to public schools. According to Cambodia Socio Economic Survey (CSES), the percentage of people

attending private school among those who attended school in 2014 was low, at about 2% in primary, lower and upper secondary education. In higher education, the corresponding rate has varied, with about 83% of women and 77% of men having gone to a private school/institution in 2014. Overall, private educational institutions have gained in popularity among students in terms of higher education in the last ten years. At higher education level, the majority of students invest a lot in foreign languages, in particular English. Some students do a bachelor degree in English language while doing another degree.

In regards to the labor market in 2013, the working population (15 to 64 years) was 9,604,000, of whom 7,974,000 people were in the labor force and 1,630,000 people were not in the labor force (CSES 2014). The unemployment rate was about 0.3% in 2013. The majority of Cambodian workers have education levels below high school. About 90% of employed persons in Cambodia have education lower than grade 12. The garment sector, which was one of the pillars of the economy, employed about 700,000 workers, of whom about 82% were women with low education attainment. The majority of garment workers had education level below high school level. A recent survey by International Labor Organization (2018) showed that more than 90% of garment workers could read; but about 85% of the workers had education below grade 11.

Education contributed significantly to economic growth across countries in the world. Mankiw *et al.* (1992) found that the percentage of the working-age population that is in secondary school, which was used as a proxy for human capital accumulation, has a positive effect on gross domestic product (GDP) per capita. They pointed out that the differences in saving, education, and population growth should explain almost 80% of the cross-country variation in income per capita. According to a document by the World Bank (1993), entitled “The East Asia Miracle”, the remarkable record of high and sustained economic growth in East Asia, which was higher than all other regions of the world from 1960 to 1990 resulted mainly from remarkable achievement in primary and secondary education and high rate of private investment. An increase of 10 percentage points in the primary or secondary school enrolment rate would raise per capita income growth by 0.3%. East Asia used a strategy to mobilize public resources for primary and secondary education. Similarly, Barro and Sala-i-Martin (1995: 431), using data in the 1960s and 1970s, also found that a one-standard-deviation increase in male secondary schooling (0.68 years) raises the growth rate by 1.1 percentage points per year, whereas a one-standard-deviation increase in male higher schooling (0.091 years) raises the growth rate by 0.5 percentage points per year.

There has been not much quantitative research about education and labor market in Cambodia. A comprehensive analysis of return to education using Cambodia labor force survey has not been found. This

research aims to fill this gap in order to provide readers with a clear view of current labor market and education in Cambodia.

The organization of this research is as follows: First we describe research methodology, then the size of Cambodia’ education which is about the number of schools, of students and of teachers. Subsequently, we examine Cambodia’s labor market. Then we show the results of our empirical study about return to education. Finally we look at current government policy on education.

**RESEARCH METHODOLOGY AND DATA**

This paper uses two sets of data. The secondary data were taken from the Socio Economic Survey 2014 (CSES 2014) and education statistics from the ministry of education, youth and sport (MoEYS) of Cambodia for describing current labor markets and education in Cambodia. The analysis in the results of section 5 uses the latest Cambodia labor force survey conducted in 2012 to estimate return to education. The labor force survey provides more comprehensive data than the CSES for analyzing return to education. For wages, we use monthly cash payments from paid employment to employees. For experience, we use the time period that employees have worked for their current employers. And for education, we use the highest level of school that the employees completed/attained. A total sample of 5584 was selected to estimate return to education for those whose education level is below or equal to grade 12. Then the Mincerian regression equations were performed to estimate return to education for this group. In addition, we selected 515 samples of persons whose education were above grade 12. To estimate return to education for this group we used an independent sample t -test to investigate the difference in wage payment at each level of higher education and then calculate annualized rate of return to education.

To estimate return to education for persons below grade 12, we use the following canonical Mincer equations:

$$\ln(\text{wage}) = \text{constant} + \beta_1 \text{education} + \beta_2 \text{experience} \quad (1)$$

$$\ln(\text{wage}) = \text{constant} + \beta_1 \text{education} + \beta_2 \text{experience} + \beta_3 (\text{experience})^2 \quad (2)$$

The dependent variable in equation (1),  $\ln(\text{wage})$ , is the natural logarithm of wages and independent variables include education, which measure years of schooling, and experience. The square of experience is also included in equation (2) to account for the concavity of the earnings profile. Parameter  $\beta_1$  measures return to education and  $\beta_2$  measures return to experience. An additional year of education will increase wage by  $\beta_1 \times 100\%$ .

To account for the effect of foreign language ability we add a dummy variable called English to regression

**Table 1.** Persons aged 25 years and over by educational attainment (percent).

<b>Educational attainment</b>	<b>2004</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
None or only some education	32.7	26.8	25.7	28.3	24.7	22.2	21.3	20.4
Primary school not completed	35.2	38.6	39.6	36.0	38.3	38.0	37.8	38.4
Primary school completed	17.9	18.9	19.7	20.1	20.3	21.5	22.0	21.6
Lower secondary completed	7.8	8.7	8.3	9.2	9.7	10.7	11.0	10.7
Upper secondary completed	3.8	4.6	4.2	4.2	4.7	5.0	5.0	5.4
Post-secondary education	1.3	1.8	2.2	2.0	2.2	2.6	2.9	3.5
Other	1.2	0.5	0.3	0.1	0.0	0.1	-	-
Total	100	100	100	100	100	100	100	100

Source: Cambodia Socio-Economic Survey (CSES)

equation (2). The variable English takes the value of 1 if the person speaks English and zero if the person does not have English ability.

$$\ln(\text{wage}) = \text{constant} + \beta_1 \text{education} + \beta_2 \text{experience} + \beta_3 (\text{experience})^2 + \beta_4 \text{English} \quad (3)$$

## CAMBODIA'S EDUCATION SYSTEM

Cambodia education system follows a four-stage 6-3-3-4 system: six years of primary school, three years of lower-secondary school, three years of upper-secondary school, and four years of university. The system also includes pre-school, non-formal education and vocational trainings (Annex I). Despite rapid economic growth, average levels of education attainment, which is a measure of human capital, are still low. Human capital generally means the ability to understand and improve technology; it is not knowledge itself (Romer, 1990). Lucas (1988) refers human capital to the general skill level. According to Lucas, a worker with human capital  $h$  is the productive equivalent of two workers with 0.5 $h$ ; and human capital can be accumulated through learning-by-doing. Education and training are the most important investment in human capital (Becker, 1993: 17). Most studies use education as a measure of human capital. The evidence of human capital accumulation in Cambodia is shown in Table 1. The majority of people aged 25 years and over could not completed primary school, 58.8% in 2013. The proportions of persons who completed lower-secondary and upper-secondary education increased but were still low. Only 3.5% of persons aged 25 years and over completed post-secondary education in 2004, up from 1.3% in 2004. The United States 89% of its population aged 25 to 64 had graduated from high school and 32% had graduate from college by 2010 (Stiglitz and Rosengard, 2015: 396).

There are both public and private schools at all level of education. Public sector played greater role in providing general education than the private sector while the private sector played greater role in the provision of higher education. General education refers to education

below grade 12 and higher education refers to education above grade 12 such as university education. The increase in population and speedy urbanization as well as the quest for higher standard education are some factors for the fast development of private schools in Cambodia. The following section describes the size of Cambodia's education system.

### General education provision (up to grade 12)

Education in Cambodia was provided by both the public and private sectors. At general education level, public sector played more important role than the private sector in providing education services. Regarding public provision of general education, about 3 million students were enrolled in public general education from pre-school to grade 12. In the academic year 2015-2016, there were 3,706 pre-schools with 4,722 staff teaching 173,893 students; 7,085 primary schools with 56,421 staff teaching 2,010,673 students; 1,251 lower secondary schools with 4,722 staff teaching 558,621 students; 463 upper secondary schools with 14,434 staffs teaching 266,449 students (Education Statistics & Indicators Public Pre-school and General Education 2015/2016). Regarding private provision of general education, in the whole kingdom in 2015, there were 829 private schools with a total student enrollment of 162,046 students and 9,592 teaching staff. Of these private schools, 321 preschools enrolled 29,890 students, 357 primary schools 95,230 students, 43 lower secondary schools 2,568 students, 108 upper secondary schools 34,358 students (Education Statistics & Indicators Private Pre-school and General Education 2015/2016). Table 2 shows the number of private and public education institutions and students. The higher the education level, the enrolment rate became lower. The gross enrolment rate and net enrolment rate in primary education in 2012 were 127 and 97.4%, respectively<sup>1</sup> (UNICEF data). In 2015, the gross primary enrolment rate was 110.3%, the gross lower secondary enrolment rate 51.1%, upper

<sup>1</sup> <http://uis.unesco.org/en/country/kh> accessed Feb 09, 2021

**Table 2.** The number of schools, teachers and students in Cambodia's education system.

<b>General education (2015/2016)</b>							
<b>Education level</b>	<b>Public</b>			<b>Private</b>		<b>Informal functional literacy programme</b>	
	<b>School</b>	<b>Teachers</b>	<b>Students</b>	<b>School</b>	<b>Students</b>	<b>Teachers</b>	<b>Students</b>
Pre	3,706	4,722	173,893	321	29,890		
Primary	7,085	56,421	2,010,673	357	95,230		
Lower secondary	1,251	4,722	558,621	43	2,568		
Upper secondary	463	14,434	266,449	108	34,358		
Total	12,505	80,299	3,009,636	829	162,046	3,534	74,899
Higher education							
72 higher education institutions (HEIs) in 2008: 46 private and 26 public.							
The number of students at HEIs: 245,000 in 2010/2011							

Data sources: Ministry of Education, Youth and Sport of Cambodia

secondary school enrolment rate 23.3%. Japan, which led industrialization in the Asian region and achieved high rate of economic growth in 1960s, had primary enrolment rate and secondary enrolment rate 100 and 79%, respectively. The secondary enrolment rate in Japan in 1960 was much higher than in Cambodia in 2012.

In addition to public and private provision of general education, non-formal education also plays an important role in Cambodia's education system. Non-formal education aims to ensure that all children, youth, adults, poor people and those with disabilities realize their right to a basic education and lifelong learning. Another objective is to provide opportunities for youth and adults to access life skills and become literate. The total enrollment in the Functional Literacy Programme alone was 74,899 in 2015, taught by 3,534 teachers (Non-Formal Education Statistics and Indicators, 2015).

The number of pupil per classroom was large in 2015 for primary and secondary schools in both rural and urban areas. In Cambodia, the average number of pupils per class was 47.7 for primary school and 48.7 for secondary school. The average class sizes for urban and rural primary schools were 53.6 and 46.7, respectively. The average class sizes for urban and rural secondary schools were 52.9 and 47.5, respectively.

### Higher education provision

"Higher Education Institution" refers to those institutions offering associate, bachelor, master's and PhD degrees under relevant government agencies concerned and the Ministry of Education, Youth and Sport (MoEYS). Higher Education governance falls under the mandate of the MoEYS. This ministry is primarily responsible for primary, secondary and higher education overall in Cambodia. The Ministry of Labor and Vocational Training (MOLVT) is responsible for the implementation of technical vocational education and training programs (TVET) through the Directorate General of Technical Vocational

Education and Training (DGTNET).

Cambodia's higher education system has been growing rapidly in terms of the number of institutions, especially private universities. Unlike general education, the private sector dominated the public sector in providing higher education as the number of private higher education institutions was much greater than the number of public higher education institutions. Between 2001 and 2008, the number of private universities increased from just two to 46, while at the same time the number of public universities doubled from 13 to 26. The main reasons for this increase were the policy of public and private partnership for higher education, as well as strong demand for higher education resulting from high numbers of students completing high school. By the end of 2008, there were 72 higher education institutions (HEIs) in Cambodia. Total enrolment in both public and private HEIs has grown rapidly over the past decade, from a little over 10,000 in 1992 to 137,253 in 2009 (HRINC, 2010). A more recent study by International Labor Organization (ILO) 2013 suggested that over the last six years, total enrolment in higher education increased from around 95,000 to more than 245,000, while the percentage of female students reached 38.3 per cent from a starting value of 31.7 per cent. The number of students that obtained a bachelor degree in the academic year 2010–11 can be estimated at between 21,500 and 24,000, and those that obtained an associate degree between 8,000 and 9,000. In conclusion, at present Cambodian universities produce between 29,500 and 33,000 graduates per year, the number of female graduates being between 11,500 and 13,000.

### Education expenses

The average annual expenses for education increased markedly for all level of education, but more sharply at the lower level. Table 3 shows the expenses on all level of education. The average annual growth rate of the

**Table 3.** Average annual expenses by level (Unit: Thousand Khmer riels).

Educational level	2004	2007	2008	2009	2010	2011	2012	2013	Avg. Growth
Pre-primary	43	64	46	107	227	382	194	468	39.3%
Primary	44	61	79	111	156	216	273	342	33.2%
Lower secondary	185	185	254	280	404	465	566	744	26.1%
Upper secondary	427	423	529	663	741	868	1,020	1,259	19.9%
Technical/vocational	1,291	1,522	1,314	2,024	1,351	1,781	3,604	2,835	10.9%
Undergraduate/graduate	2,186	1,854	2,387	2,797	2,829	3,089	3,508	3,886	13.1%
GDP per Capita		2,665	3,089	3,124	3,463	3,715	3,923	4,193	

Sources: Cambodia Socio-Economic Survey (CSES) in various years

**Table 4.** Percentage of those who never attended school by age group.

Age group	2004			2013		
	Women	Men	Both sexes	Women	Men	Both sexes
7+	28.7	15.1	22.2	18.8	9.0	14.0
7-14	11.3	11.4	11.3	8.5	8.1	8.3
15-24	17.5	11.5	14.5	5.3	4.2	4.7
25-34	28.6	17.2	23.1	13.1	9.8	11.5
35-44	36.8	19.7	28.9	20.7	9.3	15.3
45-54	40.3	16.9	30.5	32.2	13.6	23.6
55-64	57.3	17.6	40.6	35.0	15.3	27.2
65+	82.9	34.9	63.1	66.1	17.4	46.8

Sources: Cambodia Socio-Economic Survey (CSES) in various years

average annual cost was 39% for pre-primary, 33.2% for primary, 26% for lower secondary, 19% for upper secondary, 10% for vocational, and 13% for graduate school. Tougher competition of private undergraduate and graduate school in recent year can be considered to be one of the factors for slow rising cost of education at that level. At general education level, education expenses were low compared to undergraduate level. The average annual expenses for undergraduate students in 2013 were about three times higher than that for upper secondary school students. An average undergraduate student spent about 92% of GDP per capita, which measures average income per person of a nation. The large gap in education expenses between upper secondary and undergraduate education may be one of the reasons why many rural students from low-income groups cannot pursue undergraduate study.

### Reason for not attending school

Although the percentage of people/Cambodians who never attended school decreased over the past 10 years, it remained high. The percentage of Cambodians 7 years and over who never attended school declined from 28.7% in 2004 to 14% in 2013. The older age groups have higher rates of persons who never attended school. About half of those who were older than 65 year olds never attended schools. Table 4 provides the percentage

of persons who never attended school by age group in 2004 and 2013.

Poverty and the need to help generate income for households left many children in Cambodia out of schools. As shown in Table 5, for students between 6 and 17 years old, the major reasons for not attending school are: (1) do not want to attend school, (2) must contribute to household income, and (3) poverty. About 12.7 % of children between 6 and 17 years old did not attend school in 2013 because they did not want to attend, while 28.8% responded they did not attend because they had to work to contribute to the household income. In 2012, as reported by the Ministry of Planning, about 1 person out of every 5 was living below the poverty line. Although the national incidence of poverty fell sharply from 47.8% in 2007 to 18.9% in 2012, regional differences persist. Poverty was highest in rural areas in 2012, which stood at 20%, followed by Phnom Penh, 16.3%, and other urban areas, 14.5%. Although tuition fee is exempted for students at public schools below or equal grade 12, most young children were finding opportunities to contribute to their households' income and did not go to school.

## CAMBODIA'S LABOR MARKET

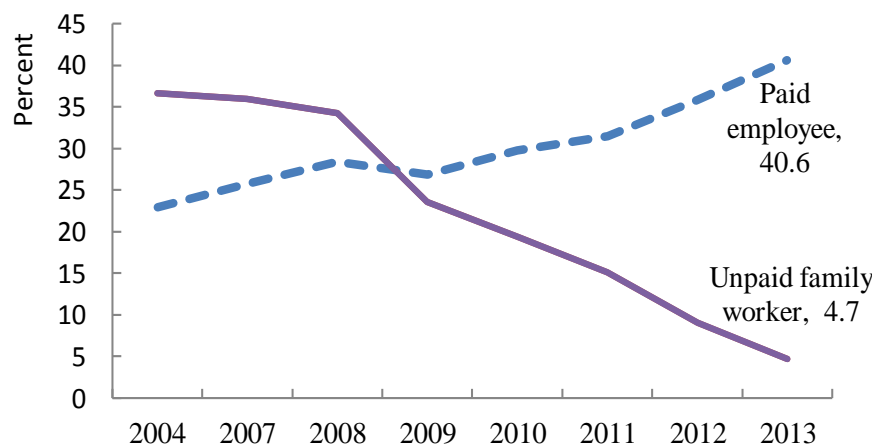
### Status of employed people

There was a tremendous change in employment status in

**Table 5.** Reasons for not attending school among persons 6-17 years of age.

Causes	2011	2012	2013
Must contribute to household income	26.4	29.1	28.8
Too young	19.2	19.6	22.0
Don't want to	15.7	17.8	12.7
Too poor	13.1	11.2	12.2
Must help with household chores	8.6	7.8	7.4
Did not do well in school	8.9	8.4	7.0
No suitable school available/school is too far - No teacher/Supplies	3.0	2.4	5.1
Due to disability - Due to long term illness (over 3 months)	3.1	3.0	3.0
Other	1.9	0.6	1.4
High cost of schooling	-	-	0.4
Total	100	100	100

Sources: Cambodia Socio-Economic Survey (CSES) in various years

**Figure 1.** Declining unpaid family workers vs. increasing paid employees.

Cambodia's labor force. In 2013, the working population (15 to 64 years) was 9,604,000, of whom 7,974,000 people were in the labor force and 1,630,000 people were not in the labor force (CSES 2014). Prior to 2008, Cambodia's labor force was characterized by a large number of young and low educated workers and the majority of Cambodia's labor force was unpaid family workers, which dominated the labor market since a majority of Cambodians were highly dependent upon agriculture for their livelihoods. Figure 1 shows the fraction of paid employees and unpaid family workers in total labor force. However, over the past 10 years, there had been an increase in the proportion of workers in positions of paid employment and a decline in the proportion of unpaid family workers. The increase in foreign direct investment in some sectors - garment, tourism, construction and so on and mostly in urban areas absorbed unpaid family workers. As shown in Figure 1, the proportion of paid employees in total employed population showed an increasing trend up from 22.9% in 2004 to 40.6% in 2013 while the fraction of

unpaid family workers declined substantially from 36.6% in 2004 to 4.7% in 2013. This drop occurred in all areas, with the other urban area dropping the most. Own account/self-employed workers, which represent the majority of employees working in Cambodia, were largely present in both other rural and urban areas. The proportion of own account/self-employed workers in total employed increased slowly in Cambodia, from 38.5% in 2004 to 54.7% in 2013, as illustrated in Table 6. In other urban and rural areas, the proportion of own account/self-employed workers rose more rapidly than in Phnom Penh, from 36.8% in 2004 to 52.8% in 2013 in other urban areas and from 39.9 to 58.6% in other rural areas. Cambodia's rural areas still play major role in generating employment. The fraction of employment in rural areas in total employment decreased from 80% in 2004 to 78% in 2013.

Table 6 also shows that the proportion of paid employees increased for all strata by 18 percentage points in Cambodia as a whole, 13 percentage points in Phnom Penh, 15 percentage points in other urban areas,

**Table 6.** Employment by status and region.

Employment status	2004				2007	2008	2009	2010	2011	2012	2013			
	Cam	Phnom Penh	Other urban	Other rural	Cam	Cam	Cam	Cam	Cam	Cam	Cam	Phnom Penh	Other urban	Other rural
Employed population, number (thousand)	6,577	591	713	5,273	7,313	7,309	7,469	7,675	7,891	7,706	7,951	942	810	6,199
Paid employee	22.9	50.9	29.7	18.9	25.8	28.4	26.9	29.8	31.4	35.8	40.6	63.6	45.0	36.6
Employer	0.1	0.0	0.1	0.1	0.1	0.1	0.3	0.2	0.0	0.0	0.0	0.0	-	0.0
Own account worker/self-employed	38.5	27.7	36.8	39.9	38.2	37.1	49.2	50.4	53.4	55.1	54.7	30.6	52.8	58.6
Unpaid family worker	36.6	19.6	31.7	39.2	35.9	34.3	23.5	19.4	15.1	9.0	4.7	5.8	2.2	4.8
Other/Don't know	1.9	1.8	1.6	1.9	0.1	0.1	0.1	0.2	0.1	0.0	-	-	-	-
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Sources: Cambodia Socio-Economic Survey (CSES) in various years

**Table 7.** Employed population (15-64 years) by industrial sector.

Industrial sector (main occupation)	2004			2007	2008	2009	2010	2011	2012	2013		
	Women	Men	both	both	both	both	both	both	both	Women	Men	Both
Employed population, (thousand)	3,035	3,068	6,103	6,828	6,824	7,469	7,673	7,890	7,706	3,882	4,068	7,951
Agriculture (Primary)	57.1	57.8	57.4	57.7	55.6	57.6	54.2	55.8	51.0	50.0	47.4	48.7
Industry (Secondary)	14.0	12.6	13.3	14.9	15.8	15.9	16.2	16.9	18.6	19.2	20.5	19.9
Services (Tertiary)	28.6	29.5	29.1	27.4	28.6	26.5	29.6	27.3	30.4	30.8	32.1	31.5
Other/Don't know/Not stated	0.2	0.1	0.2	-	-	0.0	0.0	0.0	0.0	-	-	-
Total	100	100	100	100	100	100	100	100	100	100	100	100

Sources: Cambodia Socio-Economic Survey (CSES) in various years

and 18 percentage points in rural areas. During the same period, the employer category remained stable for Cambodia, at around 0.1% of total employment.

### Employment by sector

There were noticeable changes in the structure of Cambodia's economy from 2004 to 2013. The rate of growth in the agriculture sector fell while the pace of growth in the industry and service sectors picked up. Such structural changes and growth patterns not only impacted the economy, they also affected the labor market. Employment levels in each sector varied from year to year. As shown in Table 7, agriculture was the biggest employer, followed by the service and industry sectors. As a share of all employed people in Cambodia, the agriculture share dropped slightly while the share of workers in industry and service sectors increased. Although the agriculture sector is the largest in terms of employment, its share dropped from 57% in 2004 to 48.7% in 2013. Most of Cambodia's agricultural workers farmed small pieces of land in rural areas. The large increase in tourist arrivals and speedy growth in the garment and construction sectors contributed to increased employment in the industry and service sectors.

### Employment by education level

Most workers in Cambodia have a low level of education. Of the employed population aged 15 or older, only 3.8% completed university while 93% did not complete secondary school. About 45% of employed population in Cambodia had completed primary education. Approximately one eighth (12.5%) of the estimated employed population in Labor Force Survey 2012 had no education as shown in Table 8. More than 44.9% had completed primary education while more than 35.5% had completed secondary education; only 3.8% of them were university graduates and 3.3% obtained a vocational certificate. The largest proportion of the employed population in urban areas, 44.1% (785,759 persons), had a secondary education, while the largest proportion of the employed population in rural areas, at 49.2% (2.7 million persons) had only completed their primary education.

### Education level among occupations and industries

People with a low education level were mostly engaged in agriculture work while people with university degree were mostly in managerial or professional positions. The percentage of employed persons who had a higher level

**Table 8.** Employed population aged 15 or older by education level in 2012.

	<b>Cambodia</b>	<b>Urban</b>	<b>Rural</b>
Total employed population	7,197,416	1,783,646	5,413,770
% of total employed population			
None	12.5	5.8	14.7
Primary	44.9	31.8	49.2
Secondary	35.5	44.1	32.7
Vocational	3.3	6.9	2.2
University	3.8	11.4	1.2

Sources: Cambodia Labor Force Survey (2012).

**Table 9.** Education level among occupations in 2012.

	<b>Total</b>	<b>None</b>	<b>Primary</b>	<b>Secondary</b>	<b>Vocational</b>	<b>University</b>
	7,197,416	899,955	3,230,410	2,556,581	240,350	270,118
Managers (% of total)	2.1	0.5	1.4	2.3	5.6	10.3
Professionals	4.4	0.4	0.9	5.1	29.8	29
Technicians	3.7	1.5	2.9	4.6	7.3	8.8
Clerks	2	0.5	0.6	2.4	6.8	15.5
Services and sales	21.9	17.7	19.9	25.9	19.6	24.4
Skilled agriculture workers	23.5	34.5	28.5	17.1	6.3	1.4
Craft and related trades	11.9	10.4	12.3	13.1	7.5	4.6
Machine operators	12.3	4.8	12.6	16	7.6	3.5
Elementary occupations	17.4	29.5	20.2	12.4	5.3	2.2
Armed forces	0.9	0.2	0.7	1	4.3	0.2
	100	100	100	100	100	100

Sources: Cambodia Labor Force Survey (2012).

of education decreased progressively in the agriculture and industry sectors, but it increased progressively in the services sector. As shown in Table 9, the largest share of employed persons who had not completed any level of education were engaged in skilled agriculture work (34.5%), followed by those in elementary occupations (29.5%), services and sales (17%), and craft and related trades (10.4%). As expected, the percentage of employed persons with higher education levels tend to increase in high level occupations, while it decreases among lower level occupational groups. On the other hand, the largest share of employed persons who had completed university education were engaged in professional jobs (29%), followed by those in service and sales (24.4%), clerks (15.5%), and managers (10.3%). As expected, the percentage of employed persons with higher education levels tends to increase in high level occupations, while it decreases among lower occupational groups.

## RESULTS

CSES data was used to describe labor market in Cambodia early in the study. This section uses the latest Cambodia labor force survey of 2012 to estimate return to education. For earnings/wages, we use monthly cash payments from paid employment for employees. For experience, we use the time period that employees have worked for the current employer. And for education, we use the highest level of school that the employees completed. A total sample of 5584 was selected to estimate return to education for those whose education level is below or equal grade 12. Then Mincerian regression, Equations 1 and 2 were run to estimate return to education. In addition, we selected 515 samples of persons with an education level above grade 12. We split our analysis into below grade 12 and above grade 12 because it is difficult to quantify the number of years in higher education. To estimate return to education for this



**Table 10.** Result of regression return to education for employee with education level below grade 12.

<b>Dependent variable: <i>ln(wage)</i></b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
Constant	12.35** (425.46)	12.24 (273.10)	12.27*** (188.47)
Education	0.033** (10.51)	0.033 (10.57)	0.036*** (7.48)
Experience	0.022** (4.36)	0.08 (4.215)	0.07** (2.47)
Experience square		-0.008 -3.24	-0.008** (-2.18)
English			0.117* (1.812)
Summary Statistics and joint test			
F statistics	72.03	51.61	20.82
R <sup>2</sup>	0.03	0.03	0.028
Sample size N	5584	5584	2881

\*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%; (...): t-statistics

Source: Author's analysis using data from Cambodia labor force survey (2012).

**Table 11.** Return to education and the gender gap (education below grade 12).

<b>Regressor</b>	<b>Male</b>				<b>Female</b>			
	<b>Coefficients</b>	<b>Std.</b>	<b>t</b>	<b>Sig.</b>	<b>Coefficients</b>	<b>Std.</b>	<b>t</b>	<b>Sig.</b>
Constant	12.269	0.06	189.72	0.00	12.198	0.06	201.54	0.00
Education	0.038	0.00	8.20	0.00	0.026	0.00	6.16	0.00
Experience	0.080	0.03	2.56	0.01	0.112	0.03	3.88	0.00
Experience square	-0.008	0.00	-2.25	0.02	-0.009	0.00	-2.63	0.01
	n = 2966				n = 2614			
	F = 38.4				F = 25.43			
	R Square = 0.027				R Square = 0.028			

Source: Author's analysis using data from Cambodia labor force survey (2012)

group above grade 12, we used independent sample t-test to investigate the difference in wages at each level of higher education and then we calculate annualized return to education.

### **Result of regression return to education for employee with education level below grade 12**

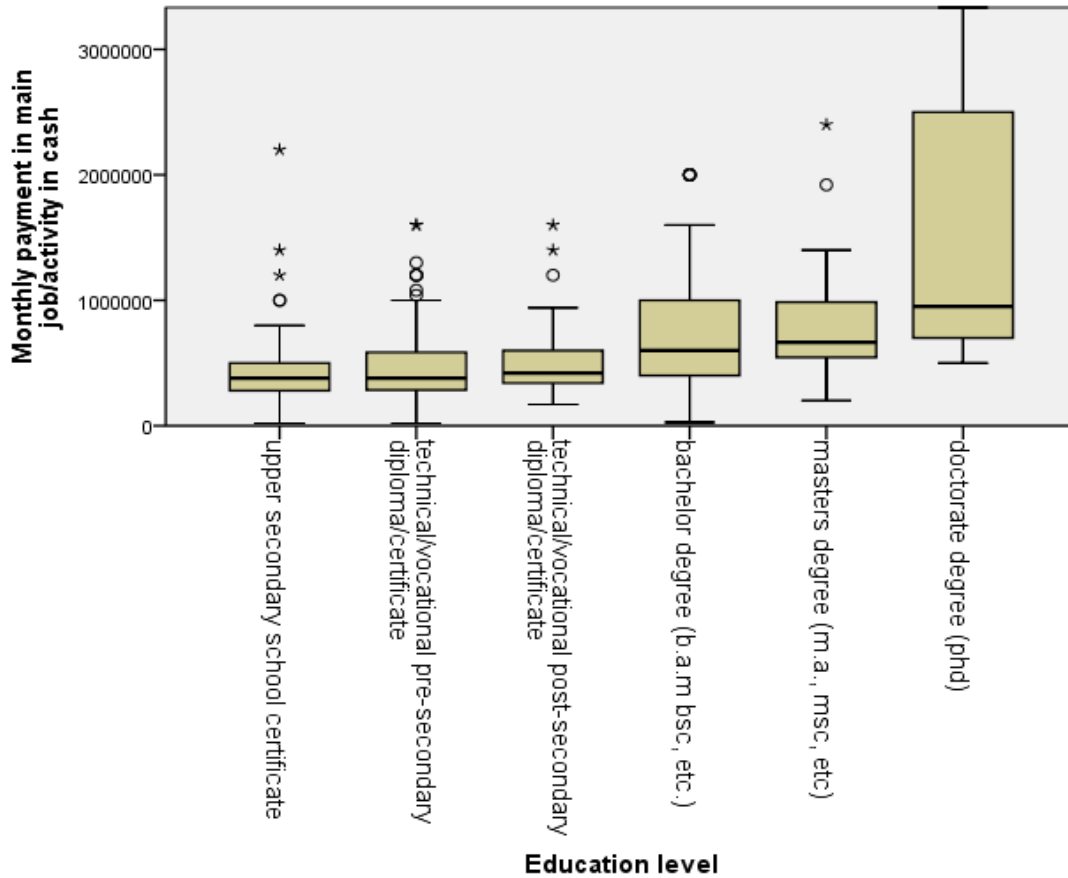
This section provides results from the standard Mincerian function or the experience-earnings profile, where the dependent variable is the natural logarithm of wages and independent variables include years of schooling and experience. The square of experience is also included to account for the concavity of the earnings profile. In Table 10, we have 2 different models to estimate return to education for employed persons with education level below grade 12 or completed high schools. The sample size is 5584, selected from the labor force survey 2012. These 5584 samples are employed persons who reported that they receive monthly cash payments. Each

model suggested that the average return to education was about 3.3%. An additional year of education will increase monthly wage by about 3.3% for this group of people below grade 12. The 95% confidence interval for the return to education in model 1 is between 2.7 and 3.9%; and in model 2 is between 2.7 and 4% which is not a very wide range. Column 3 of Table 10 shows that after controlling for education and experience, persons who speak English on average earn about 11.7% higher than others.

The return to education for male is higher than female. Table 11 indicates return to education for males and females. The estimated return to education is 3.8% for each additional year of education for male and 2.6% for female.

### **Return to education for higher education level**

In this section we estimate return to education for people with higher education levels (from upper secondary



**Figure 2.** Wage gap among different level of education degree (Unit: Khmer riels). Source: Author’s analysis using data from Cambodia labor force survey (2012).

school certificate to doctoral degree) who earned monthly cash payment. A total sample of 515 was selected from Cambodia’s labor force survey 2012. Of 515 samples, 49.7% can read and write with understanding in English, 43.7% can read and write with understanding in Khmer language only, and the remaining 6.6% can read and write with understanding in other languages including Chinese, Vietnamese and French. Figure 2 illustrates the wage gap among people with different levels of education degree. There is a minimal wage gap among those with Upper Secondary School certificates, Technical/vocational pre-secondary diploma/certificate, and Technical/vocational post-secondary diploma/certificate. And there is also not much different in earnings between Bachelor degree holders and Master’s Degree holders. However, Doctorate degree (PhD) holders earn the highest wages.

Education can explain to some extent the income gap. Bachelor degree holders earn much more than high school dropouts. Column 2 of Table 12 indicates that holders of Upper Secondary School certificates earned on average about 411 thousand riels, holders of Technical/vocational pre-secondary diploma/certificate 485 thousand riels, holders of Technical/vocational post-

secondary diploma/certificate 494 thousand riels, Bachelor degree holders 775 thousand riels, holders of Master Degree 883 thousand riels and holders of Doctorate degree (PhD) 1600 thousand riels. The riel or Khmer riel is Cambodian currency. The recent exchange rate was about 4000 riels per U.S. dollar. Column 1 of Table 12 shows that a bachelor degree holder earned 1.9 times more than high school certificate holder and the difference in earnings is also statistically significant, as indicated by independent sample t- test. From Table 12, annualized rate of return to education for undergraduate level was approximately 17%

$$\left( = \left( \frac{775503}{411648} \right)^{\frac{1}{4}} - 1 \right).$$

This calculation is based on the assumption that it takes 4 years to complete a bachelor degree after graduating from upper secondary school, and that the average monthly payment for upper secondary school holder was 411,649 riels and for bachelor degree holder 775,504 riels in 2012. This rate of return to education for undergraduate degree holders was much higher than that of persons below grade 12,

**Table 12.** Monthly wage gap among different degree holders (Unit: Khmer riels).

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Comparison with upper secondary school certificate	Mean wage	Education	Upper secondary school certificate	Technical/vocational pre-secondary diploma/certificate	Technical/vocational post-secondary diploma/certificate	Bachelor degree (b.a.m bsc, etc.)	Master's degree (m.a., msc, etc)	Doctorate degree (phd)
1.0	411,649	Upper secondary school certificate		-74014.27	-82996.94	-363854.738*	-421951.111*	-1188351.111*
1.2	485,663	Technical/vocational pre-secondary diploma/certificate	74,014.27		-8982.68	-289840.469*	-347936.842*	-1114336.842*
1.2	494,646	Technical/vocational post-secondary diploma/certificate	82,996.94	8,982.68		-280857.794*	-338954.167*	-1105354.167*
1.9	775,504	Bachelor degree (b.a.m bsc, etc.)	363854.738*	289840.469*	280857.794*		-58096.37	-824496.373*
2.0	833,600	Master's degree (m.a., msc, etc)	421951.111*	347936.842*	338954.167*	58,096.37		-766400.000*
3.9	1,600,000	Doctorate degree (phd)	1188351.111*	1114336.842*	1105354.167*	824496.373*	766400.000*	

\* indicates significant difference in wage. Source: Author's analysis using data from Cambodia labor force survey (2012).

which is about 3.3% in the earlier estimate.

### ***Wage gap between English speaking persons and persons without foreign language skill***

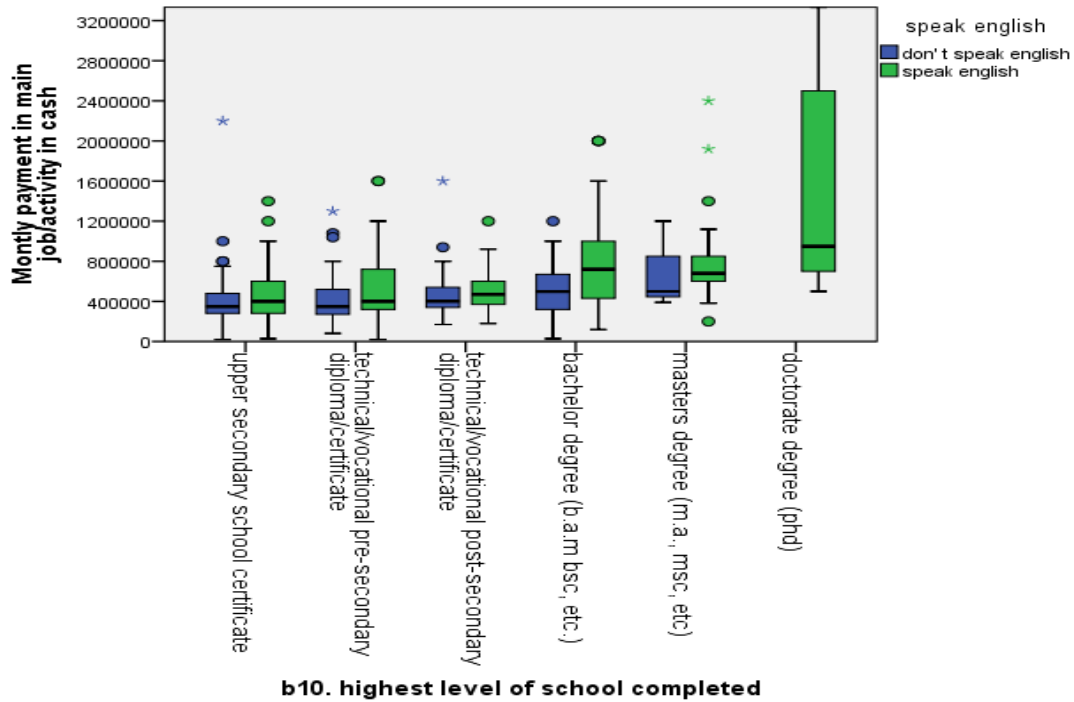
For bachelor degree holders, there is a significant large gap in earnings between persons who can read and write and have an understanding in English and persons who cannot. When considering language skills of persons at different levels of education degree, compared to

employed persons without foreign language skills, we find that people who can read and write with understanding in English can earn higher pay, especially those who hold a bachelor degree. Figure 3 shows the box plot of average wage by degree and English language skills. A person who holds a bachelor degree with English language skills can earn about 300 thousand riels more than people with only Khmer language skills for the same level of education. For persons with a bachelor degree, the 95% confidence interval for the wage gap is between 169 thousand riels and

431 thousand riels. Besides bachelor degree holders, the results of wage gap were not significant. Table 13 shows the comparison of wage between those who don't speak English and those who speak English by education degree.

### **POLICIES FOR EDUCATION IN CAMBODIA AND DISCUSSIONS**

A recent World Bank document identified four key challenges in improving and sustaining quality and



**Figure 3.** Wage gap between English speakers and person who speak only Khmer language (Unit: Khmer riels). Source: Author’s analysis using data from Cambodia labor force survey (2012).

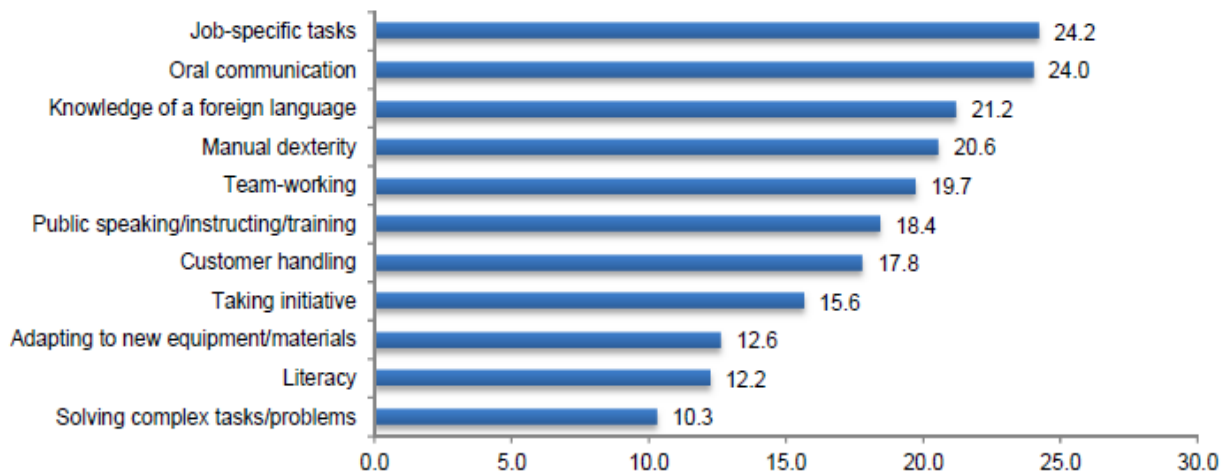
**Table 13.** Wage gap by language skill and by education degree at higher education (Unit: Khmer riels).

Education	English language skill	Mean	N	Independent Sample Test	Levene’s Test for Equality of Variances		Sig.(2-tailed)	95% Confidence Interval	
					F	Sig			
upper secondary school certificate	don't speak english	396910.91	88	Equal variances assumed	2.1816048	0.1423103	0.252	-170,751	45,204
	speak english	459684.85	33						
	Total	414031.07	121						
technical/vocational pre-secondary diploma/certificate	don't speak english	419139.13	46	Equal variances assumed	8.6450489	0.0043899	0.029	-322,655	-18,377
	speak english	589655.17	29						
	Total	485072	75						
technical/vocational post-secondary diploma/certificate	don't speak english	475788.46	52	Equal variances assumed	0.0447647	0.832956	0.557	-131,634	71,393
	speak english	505909.09	33						
	Total	487482.35	85						
bachelor degree (b.a.m bsc, etc.)	don't speak english	519338.89	36	Equal variances assumed	5.8703538	0.0164233	0.002	-490,178	-110,516
	speak english	819685.71	140						
	Total	758251.14	176						
masters degree (m.a., msc, etc)	don't speak english	696666.67	3						
	speak english	857764.71	17						
	Total	833600	20						
doctorate degree (phd)	speak english	1600000	4						
	Total	1600000	4						

Source: Author’s analysis using data from Cambodia labor force survey (2012).

efficiency for Cambodia’s higher education system: the need to improve the quality of the accreditation process; the shortage of skilled, well qualified, and experienced professors at a time of rapidly increasing enrolments; the

questionable quality and relevance of many courses; and the need to strengthen the research capacity at many HEIs (World Bank, 2009). A study by International Labor Organization (ILO) 2013 also suggested skill gap.



**Figure 4.** Skills that need to be improved, percentage of establishments. Source: ILO (2013).

Employers find their employees could not provide enough skills for fulfilling their job. Establishments need office workers with a better knowledge of foreign languages, a more developed capacity to communicate with and handle clients, and better IT knowledge. For skilled agricultural workers, craft workers, and machine operators the main demand was for more manual dexterity and better preparation on job-related tasks. The demands were similar also for higher-level positions. Establishments suggested that managers and professionals should receive more training in IT and IT applications, communications, foreign languages, and leadership; for technicians they suggested training in job-specific tasks, and planning and organization. Figure 4 shows the skills that needed improvement from the views of employers. Four skills were cited by more than 20 per cent of the establishments, in the following order: job-specific tasks, oral communication, knowledge of a foreign language, and manual dexterity.

Ministry of Education, Youth and Sports (MOEYS) has responded to the outcomes expected in the National Strategic Development Plan (NSDP) 2014-2018 by preparing the Education Strategic Plan (ESP) 2014-2018, aiming at providing quality education to more children in all levels. Three policies in ESP 2014-2018: Policy 1 ensures equitable access for all to education services: All children have access to preschool, primary school and lower secondary school and then opportunities to continue learning. For children who do not access formal education alternatives will be provided. To achieve all these, MOEYS needs to build more schools and provision of adequate teachers. Policy 2 aims to enhance the quality and relevance of learning: All children and youth have a relevant and quality learning experience, enabling them to contribute effectively to the growth of the nation. Children will learn to think analytically and critically, and will have a good grounding in mathematics, sciences and foreign languages. Policy 3 ensures

effective leadership and management of education staff: Educational services are provided effectively and flexibly. Efficient and professional management provides best value with a focus on results; timely and relevant monitoring; and reporting of the results with effective feedback and mechanisms for adjusting the policy, strategy and programs.

In Cambodia, the adult literacy rate and primary school enrolment rate increased remarkably. Education was provided by both the public and private sectors. At lower level of education from primary to higher-secondary education, public sector played greater role than the private sector while at higher education, private sector played greater role in education provision. Despite the improvement literacy rate and enrolment rate, a large proportion of Cambodian people aged 25 or older had education below secondary school while the proportion of people who had post-secondary education was very low. Large class size can be a matter for education quality. Poverty and the need to help generate income for households left many children in Cambodia out of schools. In Cambodia's labor market, more than half of the labor force had education below secondary school. Although there was remarkable progress in industry and service sectors, 51% of the total labor force was still in agriculture sector. There had been an increase in the proportion of workers in positions of paid employment and a decline in the proportion of unpaid family workers due to the increase in foreign direct investment in some sectors - garment, tourism and construction.

The analysis of return to education in the previous section using the labor force survey data 2012 suggested that an additional year of schooling for persons below grade 12 was on average 3.3% in Cambodia. This rate of return to education was far below the world average of 9.7%, below Asia average of 9.9%, and even farther below the low-income country average of 10.9% (Psacharopoulos and Patrinos, 2004). The rate of return

to education in Cambodia was similar to that of Japan and South Korea. Lee and Wee (2017) found that the returns to formal schooling in Japan are about 4.6 and 7.1% per year in South Korea. However, at upper level of education, the rate of return to education in Cambodia, 17%, was higher than the world average. The low rate of return to education at low level of education can be attributed to labor market rigidity and the large proportion of labor force in agriculture sector where education was not a selection criterion for employment. In the garment sector in Cambodia, minimum wage was binding and most of the workers had education below grade 12. Thus different education attainment of those workers did not make great change to their wages. Although the number of private higher education in Cambodia increased and competition in the industry was intensified, many students, in particular, from rural areas could not afford to pay education costs such as tuition fee and accommodation fee as most of them need to move to live near universities which are mostly located in urban areas. There seem to be a financial barrier to entering universities to do bachelor degree because the rate of return to education for bachelor degree holders was very high 17%, but many students did not pursue bachelor degrees. In addition, bachelor degree holders earned about twice more than high school certificate holders. Rate of return to education also differ between male and female. Male tends to have higher rate of return to education than female and persons who had English language skills could earn about 11% higher than those who did not have. Education attainment can explain to some extent wage gap in Cambodia. The human capital view of education, which posits that education increases the skills and wages of individuals, may take shape in Cambodia, in particular, for higher education but not much for lower level of general education. The general education in Cambodia may focus on its screening role rather than human capital accumulation.

A quality education contributed to economic growth across countries in the World and it becomes more important in the era of regional and global economic integration. The remarkable record of high and sustained economic growth in East Asia, which was higher than all other regions of the world from 1960 to 1990, resulted mainly from remarkable achievement in primary and secondary education. In East Asia, Japan led other countries in industrialization as well as in education. Fifteen-year-old students in Japan and Korea have been among the best performers in mathematics, science, and reading tests in the Programme for International Student Assessment (PISA), since 2000 (Lee and Wee, 2017). The “flying geese” (FG) model recently has become well known as a way of explaining rapid economic growth in East Asia. The FG pattern of industrial development is transmitted from a lead goose (Japan) to follower geese (Newly Industrializing Economies (NIEs), ASEAN 4, China, etc.) (Kojima, 2000). Cambodia is one of the

follower geese and needs to diversify its industry from current garment industry where simple labor force can work to a more sophisticated industry where better skills are needed. Over the past few decades, Asia has attained phenomenal economic growth and emerged into a global manufacturing hub, often referred to as “the World factory” or “Factory Asia.” Asia was the main exporters of machinery and transportation equipment (44% of the world’s total export in 2015), iron and steel as well (36% of the world’s total export), digital hardware products such as automatic data processing machines (50% of the world’s exports by China, South Korea and Taiwan) and electronic integrated circuits (63% of the world’s exports by China, South Korea and Taiwan) (Goto *et al.*, 2020). To integrate itself into the global value chain, Cambodia needs to have better human resources by improving education, on-the-job trainings and learning-by-doing. During the period of high speed of economic growth in the 1960s, one of the features that have characterized the Japanese labor market from the 1950s through the 1980s, but started to fade in the 1990s was skill formation system. In the skill formation system, acquisition of skills is encouraged for both white-and blue-collar workers, and firms provide extensive on-the-job training (Ito and Hoshi, 2020: 345).

## CONCLUSION

This paper mainly estimates the returns to education employing the standard Mincerian function using the latest Cambodian labor force survey 2012, where the dependent variable is the natural logarithm of earnings and independent variables include years of schooling or educational attainment and potential experience. The paper also examines the effect of foreign language skills on earnings. We find that for employed persons with education level lower or equal grade 12 is about 3.3 percent; but it is higher for male than female. And annualized rate of return to education for undergraduate level was approximately 17 percent. Regarding language skill, we find that for people who hold bachelor degree and can speak English can earn more than those who can speak only Khmer language. There is also a significant wage gap between bachelor holders and high school certificate holders at a ratio of 1.9. The majority of Cambodia’s labor force had low education and the enrolment rate at higher education was also low. To become a geese follower in economic development and to actively take part in building Factory Asia, quality and quantity of education need to be improved. On-the-job trainings provided by companies also necessary. For next research we should investigate the reason why labor force in Cambodia has low level of education despite the high rate of return to education at university to understand credit constraints for education. For skill development, a further research on return to skills in

Cambodia should also be conducted.

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**Annex I: The structure of the educational system in Cambodia**

