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The Price of Learning: Household Expenditures on Secondary Education in Cambodia

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Abstract
In developing countries, household expenditure on education is crucial in ensuring students' learning opportunities. In Cambodian secondary education, where informal fee charges and private tutoring in public schools are common, household expenditure is directly linked to student learning. This study adds a new perspective to previous research by examining the determinants of household expenditure on secondary education and private tutoring in Cambodia using a national representative sample. Utilizing Censored Least Absolute Deviation (CLAD), our paper reveals a notable gender disparity in educational spending, where households allocate more resources toward female students' education than male students. This gender gap extends to expenditures on private tutoring, potentially elucidating the observed reverse gender gap in recent high school graduation exam outcomes. The findings underscore the need to raise awareness among parents and caregivers about the importance of male education to address this expenditure gap. Additionally, the research highlights the influence of students' ethnic minority status on educational expenditure, revealing that households from ethnic minority backgrounds, typically with lower incomes, spend less on private tutoring. This discrepancy suggests a risk of widening academic achievement gaps between ethnic minority students and their majority counterparts. Further, the study observes a correlation between household income and educational spending, indicating that lower-income families are less likely to afford private tutoring, exacerbating educational disparities. The results call for policy interventions to address the gender and ethnic minority and income-related gaps in education, suggesting the necessity of support for disadvantaged families and a reevaluation of the private tutoring system to make education more equitable across Cambodia.
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1. Introduction

Investing in education is paramount for fostering individuals' and society's growth and progress. Developing an individual's knowledge, skills, and character through education plays a crucial role in a nation's social and economic advancement (Abad-Segura & González-Zamar, 2021). Moreover, investing in human capital is essential for breaking the cycle of poverty. However, due to limited resources, developing countries typically allocate fewer resources to education than developed countries. Furthermore, households often serve as significant sources of financing for education, mainly when government funding is inadequate (Coady et al., 2010). Examining the issue from a household perspective reveals considerable income disparities in developing countries. There is well-established evidence that poorer households allocate more of their income to daily expenses rather than investing in education. Consequently, these disparities in educational expenditure directly impact children's learning opportunities, which later translate into differences in academic performance (Darvas & Balwanz, 2013).

In the Kingdom of Cambodia (hereafter, Cambodia), the education system suffered severe damage during the Khmer Rouge regime, which lasted from 1975 to 1979, destroying numerous schools and universities and losing many educated individuals. However, Cambodia's education system has experienced remarkable development in recent decades. In primary education, Cambodia has achieved universal primary education access in the decade. Despite this growth, several issues persist within the Cambodian education system. Many children, particularly from disadvantaged families and in rural areas, are more likely to drop out due to poverty and other factors that make it challenging for families to support their children's education. Issues of low enrollment and high dropout rates in secondary education have long stagnated. Underlying these issues is a complex combination of factors, including poor educational quality, family circumstances, and other elements (No et al., 2016). Chim and Soeung (2023) contend that informal money collection in schools (informal fee charges) from students' households is one of the causes of low internal efficiency in Cambodian schools.

Furthermore, supplemental private tutoring is widespread across Cambodian primary and secondary schools. Public school teachers conduct private tutoring outside formal classes as an additional income source to supplement their low salaries (Brehm & Silova, 2014). Previous research has indicated that students who do not receive private tutoring are at risk of experiencing academic delays compared to those who do (Marshall & Fukao, 2019). Private tutoring plays a particularly vital role at the secondary school level, as all Cambodian high school students must take a high school graduation exam during their final year, grade 12. This structure prompts students and their families to seek private tutoring in preparation for the exam. Additionally, private tutoring sometimes

even covers the public education curriculum due to using morning and afternoon double-shift classes in Cambodian public schools. Consequently, this structure in secondary education is called a "public-private blurred education system" (Brehm, 2015; Wang & Ogawa, 2022). Given these situations, household expenditure is crucial in Cambodia to ensure student's learning opportunities and enhance academic achievement.

In the previous literature, prior studies have adopted overall household expenditure as the unit of analysis and have not examined what factors influence the educational expenditure of each child in the household. The Cambodian Socio-Economic Survey, the dataset used in this study, contains information on education expenditure per child and each category of education expenditure. This allows for estimating the factors influencing each child's education expenditure.

Furthermore, private tutoring has penetrated developing countries. However, a very limited number of research has quantitatively focused on households' expenditures on private tutoring and demonstrated factors influencing education investment in developing countries (e.g., Kenayathulla, 2013; Pallegedara & Mottaleb, 2018). In Cambodia, private tutoring in public schools significantly burdens students' households, particularly at the secondary education level. While many studies have investigated private tutoring and shown its situation and mechanism (e.g., Brehm & Silova, 2014; Marshall & Fukao, 2019), no studies focus on household expenditure on private tutoring in Cambodia with extensive sample coverage and a nationally representative sample. Given those gaps, apart from total household expenditure on secondary education, we also analyze factors affecting household expenditure on private tutoring. Given those points, the research questions of this study are as follows: What are the determinants of household expenditure on secondary education and private tutoring in Cambodia?

The contributions of our work are the following. First, we examine the factors influencing household expenditure for each child. This allows the characteristics of each child (gender, age, etc.) to be incorporated into the econometric model, which allows for a more detailed analysis than when the unit of analysis is household. Another contribution of this study is that, apart from household total secondary education expenditure (e.g., school fees, transportation, and food), we also analyze the factors influencing their expenditure on private tutoring for secondary school students, which plays a critical shadow role in secondary education in Cambodia. More particularly, the dataset we use in our analysis, namely the Cambodia Socio-Economic Survey (CSES), is nationally representative. Since previous studies focusing on overall education and household spending on private tutoring in Cambodia have limited their samples to certain regions, this study adds new insights to previous studies.

2. Overview of Secondary Education in Cambodia

Cambodia's secondary education system has two main levels: lower secondary education (Grades 7-9) and upper secondary education (Grades 10-12). As described in Figure 1, while access to primary education in Cambodia has improved significantly, access to secondary education remains limited. Besides, some evidence insists that education quality is also an issue in Cambodian secondary education (e.g., No et al., 2016; Tan, 2007). The government has initiated several policies to improve education to address those issues in the education system. One of the main policies is the Education Strategic Plan 2019-2023 from the Ministry of Education, Youth and Sports (MoEYS). The policy focuses on several critical areas of secondary education in Cambodia, including access and quality. Aside from low enrollment rates, the high dropout rate in secondary education has been claimed (Chhaing, 2021; No & Hirakawa, 2016).

In addition to public schooling, private tutoring, also known as shadow education, is widespread in Cambodia. Figure 2 indicates the recent participation rate of private tutoring in Cambodia. Private tutoring has the lowest numbers in primary education. In upper secondary, 77 percent of students are tutoring outside formal classes as of 2019. In government-run schools, state-employed teachers provide tutoring before or after official school hours. These educators utilize the same textbooks and instructional methods to expand the curriculum not covered during formal classroom hours (Brehm & Silova, 2014). There are many differences between official classes in public education and private tutoring, including curriculum, location, class size, instructional methods, and impact on academic performance. Through private tutoring, students are exposed to more practical exercises that go beyond the theoretical concepts of the national curriculum, receive more personalized instruction, and are more engaged by the teacher. As a result, parents and students recognize private tutoring as efficient and indispensable to help them cover and cope with the national curriculum, strengthen their academic performance, and gain a competitive edge in exams for further educational prospects (Bray et al., 2016; Brehm, 2015). On the other hand, a consensus is emerging that private tutoring in Cambodia contributes to pupil achievement gaps in some ways. For instance, public school teachers incorporate the formal curriculum into private tutoring to attract more students to private tutoring (Hammond, 2018). Hence, if students do not receive private tutoring in these circumstances, those students will not receive the full official curriculum.

3. Literature Review

This part presents the academic accumulation of factors influencing households to spend on their children's schooling or private tutoring. Wongmonta and Glewwe (2017) examined gender bias in allocating educational

resources using Thailand's 2009 Socio-Economic Survey. Their results show that girls receive more education expenditure than boys due to the following reasons: In Thai culture, there is an expectation that daughters will take on the primary responsibility for caring for their elderly parents, and the wage incomes earned by daughters are considered to be more dependable as a source of remittances for parents than the wages earned by sons. Likewise, Tilak (2002) found that in India, gender bias on household expenditure on education tends to be more common in households with lower adult education levels than those with higher literacy rates. In India, gender differences in household expenditure on education are also identified in Saha (2013), which considers significant differences in social, cultural, anthropometric, economic, and many other factors across Indian states. About pupils' disabilities, it is well known from previous research that children with disabilities are less likely to be enrolled in school compared to those without (Ysseldyke et al., 1994). Regarding household educational expenditure on disadvantaged children, Phon (2018) argued that students' disadvantaged status in physical and ethnicity negatively influences household educational expenditure in Cambodia. Using the Household Expenditure Survey in Malaysia, Tansel and Bircan (2006) examine household expenditure determinants in private tutoring. According to the result, compared to Malay families, Chinese and Indian families are more likely to sign up their children for private tutoring and invest in it. While indigenous families are less inclined to pay for tutoring, they spend more once their children participate than Malays.

Household characteristics are a significant predictor of factors affecting their education expenditure. Most previous studies mention the income elasticity of education expenditure. For instance, in Nigeria, the income elasticity of education expenditures is approximately four times greater for households in the bottom two-thirds of the income distribution compared to those in the top one-third (Jenkins et al., 2019). Tansel and Bircan (2006) showed that wealthier families spend more on their students' education in Turkey. Song and Zhou (2019) provided empirical evidence on the impact of unequal opportunity on household education investment by using the panel data from China Family Panel Studies (CFPS) in three waves (2010, 2012, and 2014). Their study demonstrated that for households that are comparatively less privileged (having heads with lower education, income, or rural hukou status), the inequality of opportunity has a more significant detrimental impact on their educational spending. Needless to say, the number of children in a household affects the total household education expenditure per child (Deaton et al., 1989). Significantly, the number of school-aged children within the household negatively influences household education expenditure in Egypt. Similarly, in Ghana, Donkoh and Amikuzuno (2011) showed that the more children there are in the same household, the lower the household expenditure on education per child. Parent's socioeconomic status (SES) is also a significant predictor of household education expenditure. Aslam and Kingdon (2008) found empirically that SES factors such as parental education level influenced students' education expenditure. Their study found a positive correlation between the father's level of education and household expenditure on their children's education.

Regarding household expenditure on private tutoring, Tansel and Bircan (2006) investigated the factors affecting household expenditure on private tutoring in Turkey. Their result showed that households' head education is statistically significant household expenditure in private tutoring. Besides, geographical differences, such as urban or rural, can determine household expenditure on their children's education, including private tutoring. Pallegedara and Kumara (2020) analyze the decision to purchase private tutoring and the associated tutoring expenses by households in Bangladesh, using household survey data collected from more than 13,500 households by the Bangladesh Bureau of Statistics (BBS) in 2000, 2005, and 2010. Their study found that urban households are more likely to acquire private tutoring services for their children than rural households, which may exacerbate socio-economic inequalities.

4. Methodology

4.1. Empirical Model

In the analysis, we employ two main empirical models. The first one is the Censored Least Absolute Deviation (CLAD) initially proposed by Powell (1984). The presence of censoring in the dependent variable arises when some observations have a lower or upper (left or right censored) bound, leading to biased estimates using conventional methods such as Ordinary Least Squares (OLS) or Standard Least Absolute Deviation (LAD). In our dataset, some students are not in the education system, so the household does not need to spend any educational costs for their children. Hence, CLAD allows us to account for the censoring present in our dataset, providing more accurate and reliable parameter estimates. The following is the identification equation of the CLAD:
Consider the following linear regression model:

$$y_i = X_i\beta + \varepsilon_i \quad (1)$$

Where y_i is the household education expenditure and private tutoring expenditure, variable for observation i, $X_i\beta$ is a vector of explanatory variables, including students, family characteristics, school type for observation i, β is a vector of parameters to be estimated, and ε_i is the error term. Let y_i^* denote the true value of y_i. If the dependent variable is censored from below at a threshold value L, the observed value of y_i can be represented as:

$$y_i = max\,(y_i^*, L) \quad (2)$$

where y_i equals y_i if $y_i > L$, and y_i equals L if $y_i^* \leq L$ (3)

The objective of the CLAD method is to estimate the vector of parameters β by minimizing the sum of absolute deviations for the uncensored data:

$$minimize\ \beta: \sum\nolimits_{-}\{i : y_i > L\}.\ \ |y_i > X_{i\beta}| \quad (4)$$

On the other hand, we utilize the Tobit model for household expenditure on private tutoring since over half of the observations were left-censored, which could not perform CLAD. In particular, if there are not enough observations in the first stage, appropriate predictions are not obtained, and a bias has appeared in the estimation of the second stage.

4.2. Data

This study utilizes the Cambodia Socio-Economic Survey (CSES) for the analysis. The CSES is a comprehensive and nationally representative household survey conducted by Cambodia's National Institute of Statistics (NIS). The primary goal of the CSES is to gather detailed data on various aspects of Cambodian households, including demographics, employment, education, health, housing, and consumption patterns. The survey's findings inform government policies, monitor the nation's progress in achieving development goals, and provide a basis for poverty analysis, social and economic planning, and decision-making. The CSES was first conducted in 1993, and NIS has not conducted annual surveys since 2007. The NIS conducted a more extensive survey, sampling about 12,000 households, more than three times the usual sample size of about 3,600 households. The CSES is typically conducted annually or biennially, providing valuable insights into the socio-economic conditions of the Cambodian population over time. In this study, the analysis is carried out using three years of extensive CESE data for 2009, 2014, and 2019.

Table 1 illustrates the percentage of secondary school enrollment and private tutoring participation based on CSES. Regarding secondary school enrollment, out of the total observation, 54.1 percent of lower secondary-aged children and 27.4 percent of upper secondary-aged children enroll in school. Regarding private tutoring participation, 46.8 percent of students in public lower secondary and 67.9 percent of public upper secondary school students participate in private tutoring. Table 2 shows the household yearly expenditure on secondary education*[1] based on CSES calculated by the authors. In CSES, we separate the household into all and only household spending secondary education, meaning households with no spending are excluded from this table. As expected, Cambodian households are more likely to spend upper secondary education than lower secondary education. If we limited the sample to positive expenditure, their yearly expenditure would be much higher than all households, especially the upper secondary level. Based on the total budget share*[2], in all cases, the expenditure accounts for over 10 percent of total household expenditure. Table 3 describes the household's yearly expenditure on private tutoring*[3]. When looking at private tutoring spending and its budget share, there is little difference from the household total education expenditure (Table 2) for both lower and upper secondary. This slight difference indicates that private tutoring proportionates a large share of total expenditures on secondary education. For the private tutoring analysis, we restricted our sample to only students attending public secondary schools since the issue of private tutoring described above is mainly observed in public secondary schools *[4]. In Tables 4 and 5, we show the definition of each variable on estimation and descriptive statistics, respectively.

5. Result and Discussion

Table 6 presents the results of factors affecting household expenditure on secondary education. Furthermore, we have created three models: students in lower secondary, upper secondary, and both. Although the main analysis here employs CLAD, the results of the Tobit model are also included as a reference to examine the validity of the analysis results. Table 6 shows that students' gender was statistically significant in all three models, meaning that in both lower and upper secondary, households spend more on their education if the students are female. Looking at the lower secondary in CLAD, having a female student increases household expenditure on the lower secondary by 8.5 percent and on the upper secondary by 11.5 percent when considering male students as the baseline. This

[1] Annual household education expenditures are reported at the individual level in the following subcategories: 1) school fees, 2) tuition including private tutoring, 3) textbooks, 4) other school supplies, 5) allowance for unattended children, and 6) school building construction funds. Total education expenditures in this study are the aggregation of the above expenditures.

[2] Total household expenditures consist of several items such as transportation, health, tobacco and drugs, gambling, clothing and footwear, housing, water, electricity, gas, and other fuels, household equipment and home maintenance, and education.

[3] The CSES dataset is not directly identifiable to the household private tutoring expenditures. Therefore, this study assumes that the tuition of students attending public lower and upper secondary schools is 0 (As the CSES the questionnaire asks in detail about many categories other than Tuition, it is assumed that informal fee charges are included in the other categories). Hence, we define the surplus of tuition as expenditure on private tutoring (see the conclusion for more detail).

[4] Private schools are also offering private tutoring after school in Cambodia. However, unlike public schools, private schools offer a full day of instruction with an official curriculum, which can cover the entire curriculum. Hence, private tutoring in private schools does not function as a role to exclude students from the complete curriculum.

result aligns with existing evidence in Thailand (Wongmonta & Glewwe, 2017). Their findings show that, in countries where women are often expected to support their families financially, families would be willing to invest more in female students' education. In Table 6, the older the students are, the more households spend on education. In Cambodia, graduation exams are held in the final year of high school, and household expenditures might be more likely to increase due to the pressure of the exam. It is, therefore, clear that Cambodian families are under pressure to invest more money in their children to give students academic advantages inside and outside of school, especially at the secondary education level.

Interestingly, our analysis shows only CLAD for upper secondary level results, which shows a negative influence of student disability on household educational expenditure. This is because parents might be unsure or skeptical about the long-term benefits of investing in their child's upper secondary education if they perceive limited career opportunities or a lower likelihood of independent living for their child with a disability due to social stigma and uncertain outcomes (Jenkinson, 1998; Phon, 2018; Lamichhane & Kawakatsu, 2015). In particular, following human capital theory, parents invest less in the upper secondary education of their children with disabilities, given the rate of return on education, because they invest in upper secondary education considering the future return of their children (Chi & Qian, 2016). This is the same for children from ethnic minority backgrounds. In Cambodia, children from ethnic minority backgrounds tend to work in the same occupations as their parents and have a lower rate of returns on education than children from the majority group. Particularly in Cambodia, where higher education enrollment rates are still low, parents' expectations for higher education enrollment for upper secondary children with disabilities are low due to limited rate of return, leading to lower household spending on upper secondary education.

Our result also implies that household characteristics significantly predict household expenditure on secondary education. The quintile of total expenditure used as a proxy for household income also affects the expenditure on students' secondary education. In particular, the CLAD coefficients are larger than the results for the Tobit coefficients. This variable is particularly important in explaining households' education expenditure on children when considering the household income proxy in total household expenditure (Sekhampu & Niyimbanira, 2013). Tuition is free from public primary to high school in Cambodia, but an informal fee is collected at school and by teachers (Bray, 1999). Such informal fee charges are a significant burden for financially poor households. In particular, total secondary education expenditures include private tutoring, which accounts for over half of all secondary education expenditures. Hence, it is natural that households with higher incomes would spend more on secondary education.

Our estimated result also shows that as the number of school-aged children in a household increases, the amount spent on education per child tends to decrease. Existing knowledge revealed that as the number of school-aged children in increases, the amount that can be invested per child decreases (e.g., Pallegedara & Mottaleb, 2018; Singh et al., 2022). Inevitably, the number of children negatively influences household educational expenditure, especially as low-income families have minimal amounts to invest in their children's education. It is not surprising that the amount that can be spent per student is less, especially in secondary education, where spending may tend to be higher than in primary education due to national graduation exams and surrounding peer pressures.

Years of the households' head education positively influence expenditure on secondary education. (If a household's years of education increase by 1 year, their expenditure on each child increases by 4.3 percent), indicating that parents with higher education are often more aware of the importance of a child's education. Parents, as the main decision-makers in investing education in their children, base their investment in their children's education on their own experiences. Given this assumption, parents with higher levels of schooling invest more in their children's education.

Regarding the school type, Table 6 shows that public schools negatively influence household expenditure on secondary education in Cambodia. The sample shows that in CLAD result, families spend 75.2 percent less on education for children attending public secondary schools than families with children attending private schools. As public schools are free of charge (as noted above, there is some informal fee charge), households spend significantly less on education than private schools.

Table 7 demonstrates the result for factors affecting household expenditure on private tutoring. As in the analysis of factors influencing overall secondary education expenditure discussed above, Cambodian households tend to spend more on private tutoring for female students. The most recent high school graduation examinations can also explain this result. In the 2023 high school graduation examinations, about 70 percent of female students got A grades, compared with only about 20 percent of male students who obtained an A grade (Ry, 2023). This examination result shows that female students do better academically than men. This phenomenon may indicate that households have higher expectations for women's education and tend to invest more money. Student age also statistically significantly and positively influences household spending on private tutoring. The increased investment in private tutoring can explain this result, an essential driver of student learning each time the student's grade level increases and the high school graduation exam approaches. The results show that as the student's grade level increases and the high school graduation exam approaches, the pressure to study increases for the student

and their family. Hence, investment in private tutoring, an important driver of student learning outcomes, increases. Our estimation showed that the ethnic minority variable negatively influenced expenditure on private tutoring at the upper secondary level. In this sense, Kenayathulla (2013) reveals that in multi-ethnic Malaysia, students from Chinese and Indian backgrounds receive more private tutoring expenditure from their families than students of Malay ethnicity. Since Cambodia also has a certain number of people from ethnic minority backgrounds, and such families tend to be in jobs with mainly low incomes, indigeneity may influence household expenditure on private tutoring.

In terms of household characteristics, in line with other research findings, the higher the total household expenditure, the higher the expenditure on private tutoring (e.g., Dang, 2007; Kim and Lee, 2010), suggesting that spending on private tutoring tends to increase with wealthier households in Cambodia. The analysis also reveals that urban households invest more in private tutoring, which is consistent with Pallegedara and Kumara's (2020) argument for disparities in private tutoring between regions in Bangladesh. In Cambodia, there are many universities, especially in Phnom Penh, and students and their parents are exposed to such an educational environment, which stimulates more willingness to spend on tutoring. Opportunistically, there are also more opportunities to receive tutoring in urban areas than in other cities, as tutoring facilities exist outside of public schools. Finally, the year dummy variable showed statistical significance on private tutoring expenditure. Looking at the estimation result in the upper secondary level, the dummy years of 2014 and 2019 positively influence household expenditure for private tutoring. In the academic year 2014 the Cambodian government conducted tremendous education reform in 2014, and one of the implementations was to prevent students from cheating on high school graduation exams. After that implementation, the passing rate of graduation exams decreased from around 80 percent last year to 20 percent in 2014. Besides, after this education reform, parents began to invest more money in private tutoring of their children to ensure more educational opportunities and to ensure their children pass their graduation exams (Soeung, 2021).

6. Conclusion

This paper has explored the factors affecting household expenditure on secondary education, including private tutoring, a significant component of the public education system in Cambodia. Our estimation showed that households in Cambodia spend more on education for female students than male students. Households also tend to spend more on female students regarding private tutoring, so this gender gap may be essential in explaining the reverse gender gap in recent high school graduation exam results. Parents or caregivers need to be made aware of the importance of education for males to fill in the gap in expenditure on secondary education. Policy discussions in Cambodia need to consider the gender gap in education with a renewed focus on males. Our study also found that students' ethnic minority backgrounds negatively influenced household expenditure on private tutoring in upper secondary education. In Cambodia, ethnic minorities tend to have lower incomes than the majority and spend less on private tutoring. These conditions can lead to an academic achievement gap between students with ethnic minorities and the rest of the majority.

Estimated results also show that the higher the household expenditure, which indicates the family's income, the higher the expenditure on the child's education. In particular, households in income quintiles 1 and 2 spend less on education and private tutoring than those in the top quintiles. These results imply that economically disadvantaged families in Cambodia are less likely to spend on their children's education. The lack of access to private tutoring, especially in Cambodia, or the fact that it is only available for a few hours, is directly related to student learning delays. Household expenditure on education, including private tutoring, has become a burden on households, especially after the 2014 education reform. Therefore, relief or financial assistance for these disadvantaged families and students is indispensable. Alternatively, even if it is difficult to abolish private tutoring, the tutoring format in which public secondary school teachers collect money needs to be changed. Besides, those alms should reach families in the countryside.

Our study has some limitations we have to keep in mind. The first limitation is the variable definition of household expenditure on private tutoring. This study adopts the household expenditure on secondary school students' private tutoring. To extract only expenditures on private tutoring in public schools, as discussed above, our study limits the sample to only students studying in public secondary schools since the CSES questionnaire did not ask about household expenditure on private tutoring directly. The questionnaire asks how much each household spends on private tutoring for each child outside school and non-formal education as other separate items. If some household spending as an informal fee changes other than private tutoring, defined as "tuition," expenditure on private tutoring of our analysis contains other items. It can not exactly capture the household expenditure on private tutoring. The second limitation is that our estimation did not include the variable related to education supply-side factors, such as school and teachers' characteristics. Such variables might affect households' spending on education, including private tutoring, and may introduce bias in the coefficients of other variables. Future research may cover the above points.

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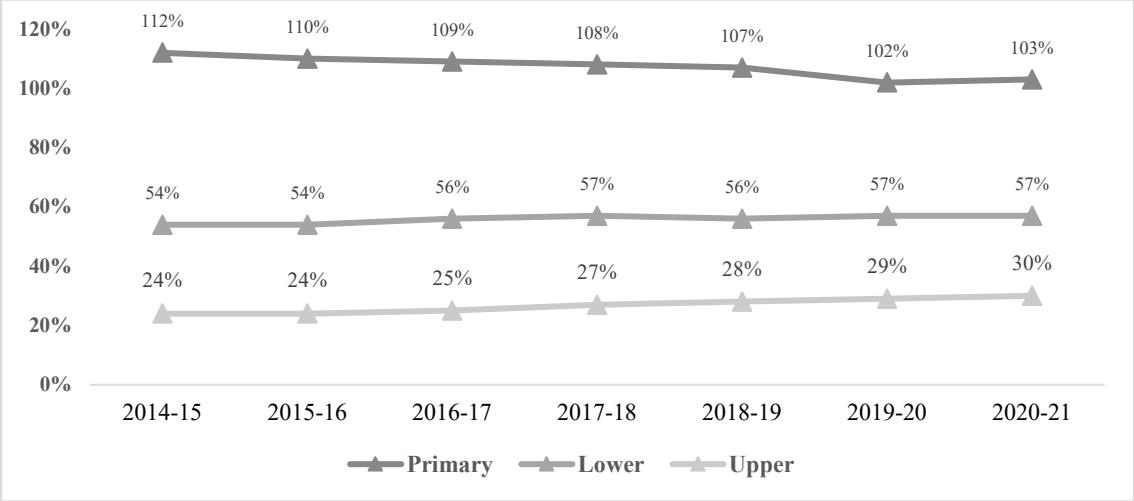
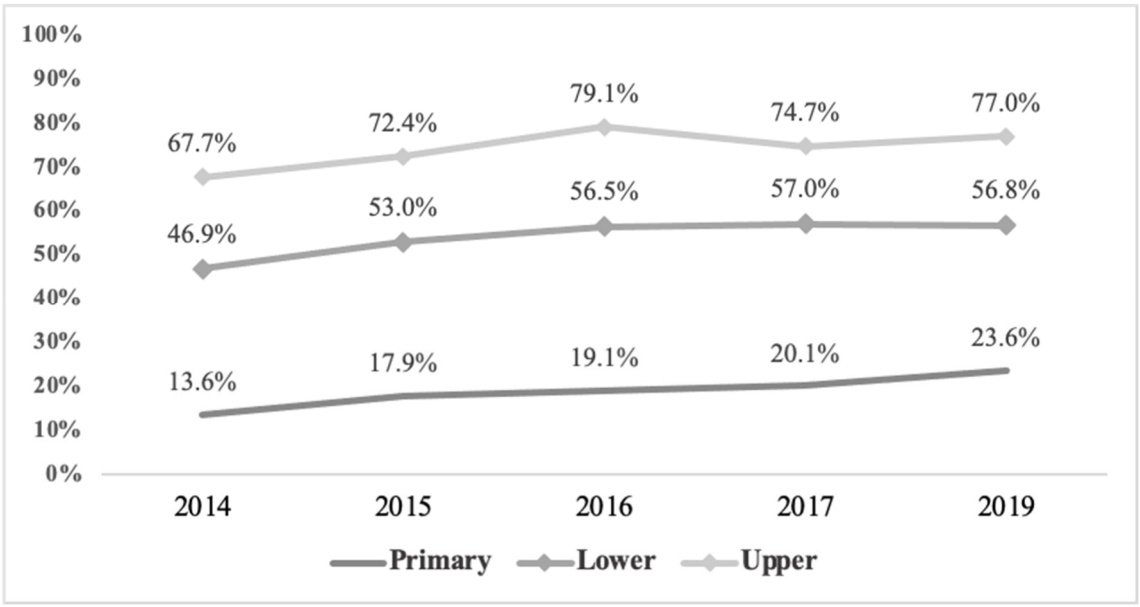
Figure 1. Secondary Education Participation



Created by Author based on Cambodia Public Education Statistics and Indicators (2014-2021)

Figure 2. Private Tutoring Participation



Created by Author based on CSES 2014-19

Table 1: Percentage of Secondary School Enrollment and Private Tutoring Participation

Attendance	Secondary School Enrollment		Tutoring Participation	
	Lower	Upper	Lower	Upper
Percentage	54.1%	27.4%	46.8%	67.9%
Observation	9,995	9,495	5,282	2,522

Created by Authors based on CSES 2009, 2014, and 2019

Table 2: Household Yearly Expenditure on Secondary Education (Per Each Child)

Expenditure	All Household		Only Household with Positive Expenditure	
	Lower	Upper	Lower	Upper
Riel	452,914	505,261	517,475	864,562
US $	109.0	121.4	124.8	208.6
Budget Share	10.6%	12.4%	14.7%	15.0%

Created by Authors based on CSES 2009, 2014, and 2019

Table 3: Household Yearly Expenditure on Private Tutoring

Expenditure	All Household		Only Household with Positive Expenditure	
	Lower	Upper	Lower	Upper
Riel	192,885	420,275	422,522	629,557
US $	46.5	101.4	101.9	151.9
Budget Share	8.3%	10.1%	11.5%	12.1%

Created by Authors based on CSES 2009, 2014, and 2019

Table 4: Definition of the Variable

Variable	Definition
Edu_Exp	Logarizm of annual total amount of expenditure on education
PT_Exp	Logarizm of annual total amount of expenditure on private tutoring
Student Factor	
Female	Dummy variable taking1 if student is female otherwise 0
Age	Continuous variable of students' age
Disability	Dummy variable taking 1 if student has physical disability otherwise 0
Minority	Dummy variable taking 1 if student has ethnic minority background otherwise 0
Household Factor	
Logexp_q1	Logarizm of annual amount of total expenditure (Reference: Logexp_q1)
Logexp_q2	
Logexp_q3	
Logexp_q4	
Logexp_q5	
No_child	Continuous variable for number of children aged 6-17 in the household
Head_female	Dummy variable taking 1 if household head is female, otherwise 0
Head_Y_Schooling	Continuous variable for household heads' years of schooling
Urban	Dummy variable taking 1 if household is located in urban area
School Factor	
Public	Dummy variable taking 1 if school is public
Year	
Year_2009	Dummy variable for years of dataset
Year_2014	
Year_2019	

Created by Authors based on CSES 2009, 2014, and 2019

Table 5: Descriptive Statistics

Variable	Education Expenditure			Private Tutoring Expenditure		
	Mean	Min	Max	Mean	Min	Max
Edu_Exp	9.14	0	17.40	-	-	-
PT_Exp	-	-	-	6.36	0	16.03
Student Factor						
Female	0.49	0	1	0.49	0	1
Age	14.44	12	17	14.38	12	17
Disability	0.01	0	1	0.01	0	1
Minority	0.05	0	1	0.03	0	1
Household Factor						
Logexp_q1	0.22	0	1	0.14	0	1
Logexp_q2	0.20	0	1	0.17	0	1
Logexp_q3	0.19	0	1	0.21	0	1
Logexp_q4	0.20	0	1	0.24	0	1
Logexp_q5	0.19	0	1	0.25	0	1
No_child	3.12	1	12	2.94	1	11
Head_female	0.20	0	1	0.19	0	1
Head_Y_Schooling	6.46	0	21	7.04	0	21
Urban	0.26	0	1	0.32	0	1
School Factor						
Public	0.98	0	1	-	-	-
Year						
Year_2009	0.42	0	1	0.30	0	1
Year_2014	0.32	0	1	0.44	0	1
Year_2019	0.26	0	1	0.26	0	1

Created by Authors based on CSES 2009, 2014, and 2019

Table 6: Result for Household Education Expenditure Analysis

Variable	Full Sample				Lower Secondary				Upper Secondary			
	CLAD		Tobit		CLAD		Tobit		CLAD		Tobit	
Student Factor												
Female	0.078***	(0.02)	0.133***	(0.03)	0.085***	(0.03)	0.161***	(0.03)	0.115***	(0.03)	0.091**	(0.04)
Age	0.140***	(0.01)	0.165***	(0.01)	0.129***	(0.02)	0.160***	(0.02)	0.151***	(0.02)	0.141***	(0.02)
Disability	-0.184	(0.14)	0.074	(0.17)	-0.164	(0.17)	0.12	(0.22)	-0.358**	(0.17)	0.008	(0.24)
Minority	-0.015	(0.06)	0.013	(0.07)	-0.097	(0.08)	0.06	(0.10)	-0.208**	(0.08)	0.06	(0.11)
Household Factor												
Logexp_q2	0.189***	(0.04)	0.122***	(0.05)	0.421***	(0.05)	0.208***	(0.06)	0.05	(0.05)	-0.028	(0.07)
Logexp_q3	0.600***	(0.04)	0.451***	(0.05)	0.697***	(0.05)	0.542***	(0.06)	0.472***	(0.05)	0.306***	(0.07)
Logexp_q4	0.840***	(0.04)	0.722***	(0.05)	0.990***	(0.05)	0.833***	(0.06)	0.708***	(0.05)	0.558***	(0.07)
Logexp_q5	1.054***	(0.04)	0.956***	(0.05)	1.137***	(0.05)	0.955***	(0.06)	0.986***	(0.05)	0.945***	(0.07)
No_child	-0.110***	(0.01)	-0.108***	(0.01)	-0.119***	(0.01)	-0.114***	(0.01)	-0.092***	(0.01)	-0.099***	(0.01)
Head_female	0.190***	(0.03)	0.116***	(0.03)	0.108***	(0.04)	0.145***	(0.05)	0.140***	(0.04)	0.072	(0.05)
Head_Y_Schooling	0.043***	(0.00)	0.047***	(0.00)	0.034***	(0.00)	0.051***	(0.01)	0.045***	(0.00)	0.041***	(0.01)
Urban	0.566***	(0.03)	0.590***	(0.03)	0.583***	(0.03)	0.581***	(0.04)	0.522***	(0.03)	0.603***	(0.04)
School Factor												
Public	-0.752***	(0.07)	-0.769***	(0.08)	-0.687***	(0.10)	-0.935***	(0.13)	-0.726***	(0.08)	-0.629***	(0.11)
Year												
Year_2014	1.115***	(0.03)	1.092***	(0.03)	1.239***	(0.04)	1.135***	(0.05)	0.901***	(0.04)	1.022***	(0.05)
Year_2019	1.481***	(0.03)	1.393***	(0.04)	1.563***	(0.04)	1.369***	(0.05)	1.397***	(0.04)	1.431***	(0.05)
Observation	11,846				7,184				4,662			
Left-Censered	7,644				2,811				4,833			
Pseudo R2	0.27		0.12		0.31		0.11		0.31		0.13	

Notes: (1) Created by Author based on CSES (2) Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 (3) The absolute value of the *t* statistics in parentheses was calculated by using standard errors obtained with the bootstrapping represented by 1,000 times.

Table 7: Result of Household Education Expenditure on Private Tutoring

Variable	Full Sample		Lower		Upper	
	Tobit		Tobit		Tobit	
Student Factor						
Female	0.594***	(0.12)	0.546***	(0.17)	0.30	(0.23)
Age	0.471***	(0.04)	0.420***	(0.10)	0.428***	(0.14)
Disability	0.344	(0.91)	0.60	(1.40)	-1.65	(1.80)
Minority	-0.317	(0.38)	-0.19	(0.55)	-1.563**	(0.79)
Household Factor						
Logexp_q2	-0.324	(0.23)	0.28	(0.33)	-1.312***	(0.51)
Logexp_q3	0.926***	(0.23)	1.231***	(0.33)	0.74	(0.48)
Logexp_q4	2.357***	(0.23)	2.725***	(0.32)	1.562***	(0.45)
Logexp_q5	3.019***	(0.23)	3.554***	(0.34)	2.009***	(0.45)
No_child	-0.463***	(0.04)	-0.549***	(0.06)	-0.425***	(0.08)
Head_female	0.172	(0.16)	0.456**	(0.22)	-0.31	(0.30)
Head_Y_Schooling	0.212***	(0.02)	0.216***	(0.03)	0.191***	(0.03)
Urban	2.194***	(0.14)	2.641***	(0.19)	1.441***	(0.25)
Year						
Year_2014	1.106***	(0.16)	0.04	(0.22)	2.131***	(0.29)
Year_2019	2.673***	(0.18)	1.962***	(0.26)	4.074***	(0.33)
Observation	4,184		2,472		1,712	
Left-Censered	3,620		2,810		810	
Pseudo R2	0.04		0.04		0.04	

Notes: (1) Created by Author based on CSES (2) Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1