Seminar Paper

Household Education Expenses and University Attendance in Thailand

Submitted by

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EE469 Seminar in Development Economics

Semester 2/2022

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Abstract

This paper determines the effect of household education expenses on attendance rate by using binary and multinomial logistic regression. This paper uses two data sets of middle and high school students from the SES panel in the years 2010 and 2012, which used data from 2010 to analyze the outcome of the attendance rate in the year 2012. The study found that the increase in household education expenses can increase the probability of high school and university attendance. Differentiate to male students, female students are less unlikely to participate in both high school and university. Compared to students whose parents never went to school, students whose parents have high educational levels have a greater chance of attending high school and a university.

Keywords: Household education expense; attendance rate; middle school education; high school education; university; Thailand

1. Introduction

One of the most important aspects for global development is education. In Thailand currently, there are three different forms of education: formal, non-formal, and informal. For compulsory education in Thailand, Thai citizens are required to complete at least lower secondary education and must attend school at the latest at the age of seven years. The International Institute for Management Development (IMD) ranked the country's competitiveness in the education sector in 2022 at 53, which improved from the previous year by 3. However, education in Thailand still has some issues.

According to the Poverty and inequality report 2021 from the National Economics , the net enrollment rate of the level of junior high school is 69.5%, high school is 64.1%, and the bachelor's degree is 30.2%. The data shows that the attendance rate decreased as the education level increased. Attending a higher level of education needs more budget. To study at a university, The average cost outside of the free tuition policy is 15,015 baht in 2020 information from the National Economics and Social Development Council. The attendance rate at higher levels has fallen as a result of rising expenses. Due to this issue, there may be a difference in educational access between the rich and the poor.

According to the data from NSO, the average monthly household educational expenses in 2013, 2015, 2017, 2019 and 2021 were 318, 356, 376, 319, and 337 baht respectively. Education expenditure can be divided into direct and indirect costs. Also, there are entrance fees (TCAS) associated with attending institutions, which is not advantageous for low-income population groups. Moreover, from the poverty and inequality report 2021, Net enrollment at the undergraduate level of the richest 10% of children is 64.3% compared to The poorest 10% of children is 11.1%. According to the household socioeconomic survey conducted in 2021, the average cost of schooling for the lowest family is 2610 baht while it is 42,700 baht for the richest family. The results suggest that there may be disparities in educational opportunities between the rich and the poor.

Even though some research findings suggest that household education expenses may not affect university attendance, for instance, Gurun & Millimet (2008) papers state that when a positive section is taken into account, household education expense on private tutoring does not affect university placement. Benckwitz et al. (2022) also found that private tutoring did not alone increase student results. However, the main sources of funding for educational opportunities are

household expenses. Parents' capital expenses are the vital input that affects children's learning and achievement developing human capital growth (Ghate et al., 2015). Moreover, household education expenditure is one of the important parts of education inputs (Naiddo et al., 2022). We need to conduct additional study on this topic because household education expenses are a significant funding source for education. Studying how family education expenses affect educational achievement might thus help governments or educational institutions better grasp the issue and develop strategies that would enhance the educational system.

The research questions are the followings:

1. Does annual household education expenses affect educational attendance?
2. Do other family background factors affect educational attendance?

The research objectives:

1. To study and compare the students from various socioeconomic backgrounds that can affect educational attainment.
2. To find the effect of education expenses at various education level

Students with educational backgrounds ranging from lower secondary school to a bachelor's degree will be the primary focus of this study article. The study makes use of SES panel data, which hasn't been widely investigated in other articles. However, this data has only a 6 year data set, and the latest year is 2017. Therefore, this is the limitation of the study.

2. Literature Review

My research topic is focused on the relationship between household education expenses and education attainment. The literature review part consists of 10 papers that relate to my topic. Each paper's results are different. Moreover, some research papers found other interesting results, which will be discussed in more following.

The research papers are divided into four groups. First group is household education expenses and education attainment. Both research papers have the same result, which is that

household education expenses can increase children's educational attainment. Moreover, each research paper has an additional result. Education of the household head may have an impact on the children's educational success Nabiddo, Yawe & Wasswa (2022). However, Varughese & Bairagya (2021) use state areas to explain the education attainment gap that southern and western states have higher educational attainment than other states. The availability of private institutions is the cause, as some states' rural areas lack the resources to pay for the private institutions. Furthermore, the idea is explained in these two papers using various economic theories. Whereas Nabiddo, Yawe, and Wasswa (2022) use intertemporal theory, Varughese & Bairagya (2021) use an education production function.

The second group is household education expenses and educational attainment that relate to education loans or credit. Chandrasekhar, Rani & Sahoo (2016) discuss the correlation between higher education expenses and net attendance ratio, and the relationship is not different among regions. Moreover, it also discusses education loans that almost 70% of education loans come from the southern state because poorer states are more risk averse. Tansel (1988) explains that it has a positive relationship between household education expenses and school attainment. Additionally, credit constraints are more important among the poor, and poor households are more risk averse, which has the same result as Chandrasekhar, Rani & Sahoo (2016).

The third group is household education expenses and educational attainment that relate to gender. Higher education results in increased education costs, according to Rashmi et al. (2022). Also, higher education leads to lower school attendance. Also, this study discovered that households spend less money on girls' education than they do on boys, and that gender bias results from girls' lower attendance rates. Another paper, by Desai (2008) found a different result. From the research, they found that it has a gender bias. However, in urban areas, households invest more money on girls' education than on boys'.

The fourth group is private tutoring and college attendance, which consists of four research papers. In general, all research papers the result have a positive relationship between private tutoring and college attendance. According to Stevenson & Baker (1922), private cram schools and other forms of shadow schooling can boost university enrollment. Furthermore, because females are less likely to enroll in shadow schooling, gender inequalities might widen the disparity in university attendance. The findings of Hajar & Abenova (2021) are consistent with those of the earlier study. Students that study with private tutoring can benefit by receiving

higher grades, which have increased chances of getting into universities. Also, they discovered problems with disparity between the rich and the poor in private tuition. Private tutoring can enhance the chance of being accepted into a university Tansel & Bircan (2005). Also, they discovered that girls are more unlikely than boys to participate in private tutoring, which is consistent with Stevenson & Baker (1922). According to Silva (2020), paying for private tutoring can raise a student's likelihood of enrolling in college. Moreover, the author found a concavity relationship between college attendance and private tutoring meaning that spending on private tutoring has a diminishing curve with college entrance. Therefore, these are ten literature reviews.

In conclusion, the research is separated into four groups by themes. The research papers may have the same or different results in each group. My topic is focusing on household education expenses and university attendance in Thailand. This does not have a lot of people focus on this topic. There have been several investigations on the correlation between household educational expenses and pupil progress or achievement include (Zhang & Zhou 2017). Several more studies have looked at the relationship between private tutoring and academic success, including (Zhang 2013; Zhang & Liu 2022; Ansong et al 2023). The themes of several study studies on private tutoring and college enrollment include (Tansel & Brican 2005; Hajar & Abenova 2021; Stevenson & Baker 1992; Silva 2020). Also, some authors highlight the amount a family spends on education along with school attainment, including (Nabiddo et al 2022; Varughese & Bairagva 2021 Tansel 2002). In addition, (Wongmonta & Glewwe 2017) recommend further investigation of household educational expenses and educational outcomes in Thailand. As a result, it inspires me to continue my research.

3. Conceptual Framework

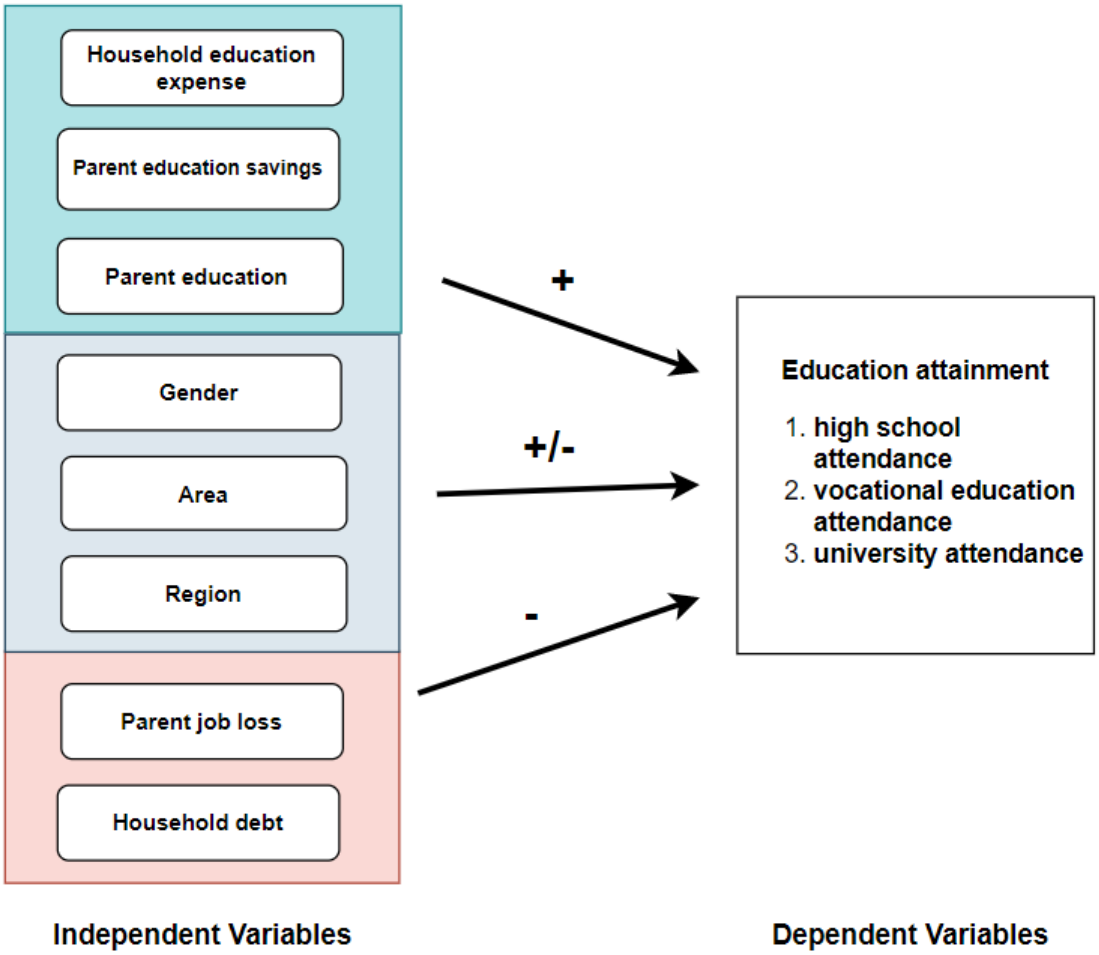
Two main theories are used to explain the relationship between household education expenses and education attainment. First, is the education production function. The education production function is the model used to explain the relationship between household education expenses and education attainment. The education production function is a relation between education input and output. Education inputs come from households, schools, the public, etc. Education output can be education attainment or student learning performances. Household education expenses are one of the education inputs used by Varughese & Bairagya (2021), while

education attainment is one of the outputs of their education production model. According to the findings, household education expenses and educational attainment are positively correlated.

The human capital hypothesis is the second theory. Investment in education increases lifetime wealth Becker (1975). Families must weigh the costs and benefits of investing in education before making a decision. Tansel (2002). Future income could represent a benefit, but the opportunity cost of delaying employment is a cost as well. Families will continue to spend money on education as long as the return is greater than the cost (Tansel, 2002). Moreover, Naurin & Pourpourides (2022) discovered that spending on education by the government and households is rising at an equal rate as time passes, although household spending is larger. As a result, it demonstrates that families prioritize education, with most funding coming from households rather than public expenditures.

Family background and gender are other factors that influence educational attainment in addition to household education expenses. Middle school and high school students are divided into two groups for this study. I define middle school students' educational attainment as high school attendance. Vocational education and university attendance are the educational attainment for high school students. I choose middle and high school children because I want to compare how different household education expenses in different groups are. Also, I believe that high school children may have high expenses for their education, such as paying for private tutoring for a university, which may help me better understand the expenses. The results of additional studies are shown in the table below, and they can support my hypothesis about other independent factors.

Independent variables	Expected sign	Author	References
Household education expense	+	Desai & Veenakulkarni (2008)	Household education expenses can increase college attendance
Gender (male and female)	+/-	Tharmmapornphilas (2013)	Females in 15-17 years has higher school attendance rate than male
Parent job loss	-	Coelli (2011)	Parent job loss has a negative impact on post-secondary education enrollment.
Parent education (In different levels)	+	Newbold & Brown (2015)	Parent education has a positive relationship with university attendance.
Parent education savings	+	Song & Elliott (2012)	Parent education savings have a positive relationship with four-year college attendance
Household debt	-	Zhan & Sherraden (2011)	Debt can decrease children's college attendance
Area (rural and urban)	+/-	Varughese & Bairagya (2021)	Urban area have high educational attainment, but rural area have low educational attainment
Region	+/-	Wongsurawat (2010)	The West and East region has the highest school attendance. Central, North and South regions have medium school attendance rates. Northeast has the lowest school attendance rate.



4. Data and Methodology

4.1 Data set

In this research, I decided to use the SES panel as a statistical source for this study. SES stands for Socio-Economic Survey. The SES panel is a data collection that uses the same sample to gather details about household income, spending, debt status, assets, and housing characteristics in order to assist determine the long-term impact. I decided to use the SES panel in the years 2010, 2012, and 2017. I primarily take eight factors from the SES panel. The first factor is household education expenses, which is per head of family education expenses during the previous 12 months before the interview. Gender is the second factor. The third variable is parent job less, which is the number of periods of unemployment . The fourth variable is parent education. The fifth factor is parent education savings. The sixth factor is area. The seventh factor is region. The final variable is household debt, which is outstanding debt per person.

4.2 Methodology

Binary and Multinomial logistic regression are used to analyze the relationship between household education expenses and education attainment because this model is appropriate for the result that has a binomial outcome and more than two outcomes. I use binary logistic regression with middle school students. High school students used multinomial logistic regression. The estimating model looks such as this:

Estimation model

Binary Logistic regression model

Logit(p = high school attendance) = β0 + β1hexp + β2gender + β3area + β4region + β5pa_edu + β6pa_jloss + β7pa_sav + β8hdebt

Multinomial logistic regression model

Logit(p = vocational education attendance) = β0 + β1hexp + β2gender + β3area + β4region + β5pa_edu + β6pa_jloss + β7pa_sav + β8hdebt

Logit(p = university attendance) = β0 + β1hexp + β2gender + β3area + β4region + β5pa_edu + β6pa_jloss + β7pa_sav + β8hdebt

where

hexp = the average of household education expense in each month during 12 months before interview

gender = equal to 1 if male; 0 if female

area = area : equal to 1 if urban; 0 if rural

region = region

pa_edu = parent education

pa_jloss = number periods of parent job loss : equal to 1 if employed; 0 if unemployed

pa_sav = parent education savings : equal to 1 if save; 0 if not save

hdebt = household debt

5. Descriptive statistic

Table1 : descriptive statistic of middle school students

	high school attendance	
	not attend	attend
gender		
male	61.90%	46.73%
female	38.10%	53.27%
area		
rural	64.73%	60.05%
urban	35.27%	39.95%
region		
Bangkok and perimeter	19.63%	18.03%
central exclude Bangkok and perimeter	31.61%	19.86%
Northern	14.98%	18.60%
Northeastern	24.13%	31.57%
Southern	9.65%	11.94%
pa_edu		
never study, below elementary, still study	17.97%	13.89%
elementary education	51.91%	43.51%
secondary education	21.13%	21.58%
tertiary education	8.99%	21.01%
pa_jloss		
unemployed	9.48%	6.31%
employed	90.52%	93.69%
pa_sav		
not saving	88.69%	84.39%
saving	11.31%	15.61%

Table2 : descriptive statistic of high school students

	vocational and university attendance		
	not attend both	attend to vocational education	attend to university
gender			
male	51.52%	52.38%	35.58%
female	48.48%	47.62%	64.42%
area			
rural	76.09%	66.67%	56.73%
urban	23.91%	33.33%	43.27%
region			
Bangkok and perimeter	6.40%	7.94%	25.24%
central exclude Bangkok and perimeter	20.88%	25.40%	16.11%
Northern	17.17%	17.46%	20.19%
Northeastern	40.40%	38.10%	25.00%
Southern	15.15%	11.11%	13.46%
pa_edu			
never study, below elementary, still study	27.95%	19.05%	17.79%
elementary education	45.45%	42.86%	36.30%
secondary education	18.86%	22.22%	22.36%
tertiary education	7.74%	15.87%	23.56%
pa_jloss			
unemployed	7.07%	17.46%	9.13%
employed	92.93%	82.54%	90.87%
pa_sav			
not saving	86.53%	90.48%	81.73%
saving	13.47%	9.52%	18.27%

Both tables show the descriptive statistics of middle school pupils and high school pupils, for which I apply different samples. In a table, it has the outcome of attendance to be the column. There are six categorical variables which are gender, area, region, parent education, parent education savings, and parent job loss. Before, parent education consisted of nine levels from the data. However, I changed it into four groups that are shown in the table. Parent education savings is the education savings of twelve months before the interview. Parent job loss is whether the parent is employed or unemployed twelve months before the interview. The percentage is used to classify categorical data.

Table 3: compare education expense and debt between 2010 and 2012 of middle school

	high school attendance	
	not attend	attend
household education expense 2010		
Mean	856.15	1435.53
Standard deviation	1246.04	2724.64
household education expense 2012		
Mean	951.01	1460.23
Standard deviation	1621.08	2251.10
household debt 2010		
Mean	181019.26	243436.03
Standard deviation	655579.59	623234.81
household debt 2012		
Mean	187464.39	216089.54
Standard deviation	454426.75	546826.76

Table 4: compare education expense and debt between 2010 and 2012 of highs school

	vocational and university attendance		
	not attend both	attend to vocational education	attend to university
household education expense_2010			
Mean	686.43	721.38	2124.53
Standard deviation	989.63	859.80	4136.98
household education expense 2012			
Mean	387.99	1301.06	2576.38
Standard deviation	948.96	2813.39	3216.20
household debt 2010			
Mean	156465.12	174814.29	331573.56
Standard deviation	279291.57	312843.85	890751.40
household debt 2012			
Mean	146622.81	149361.90	259280.48
Standard deviation	348028.84	208398.32	702547.20

Table three and four are about numeric data, which consist of household education expenses and household debt. household education expense is the average monthly expense. Household debt is an outstanding debt. In both tables, the average household education expenses are higher when students attend compared to not attending both in 2010 and 2012. Moreover, the average household education expense for attending university is higher than high school. Students who attend school have higher debt than those who do not attend, which happened in both 2010 and 2012.

Figure 1

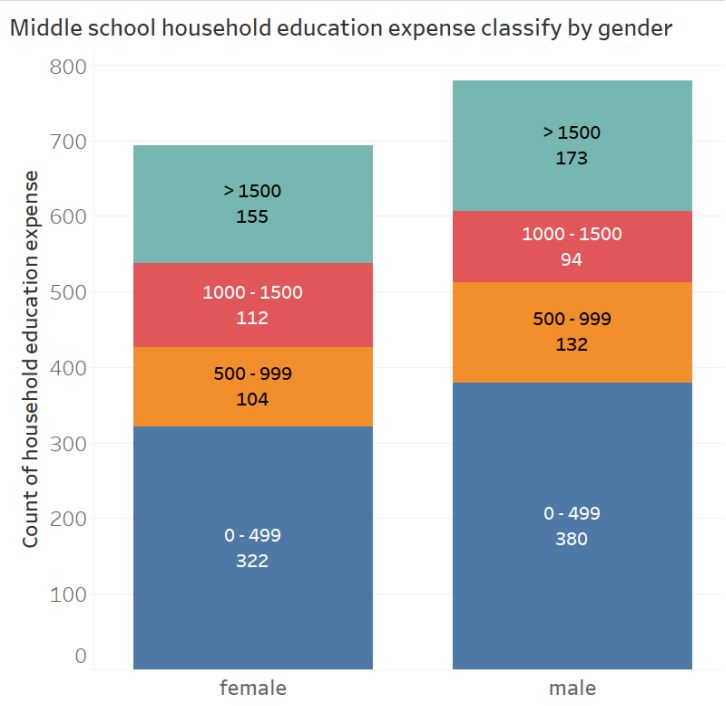
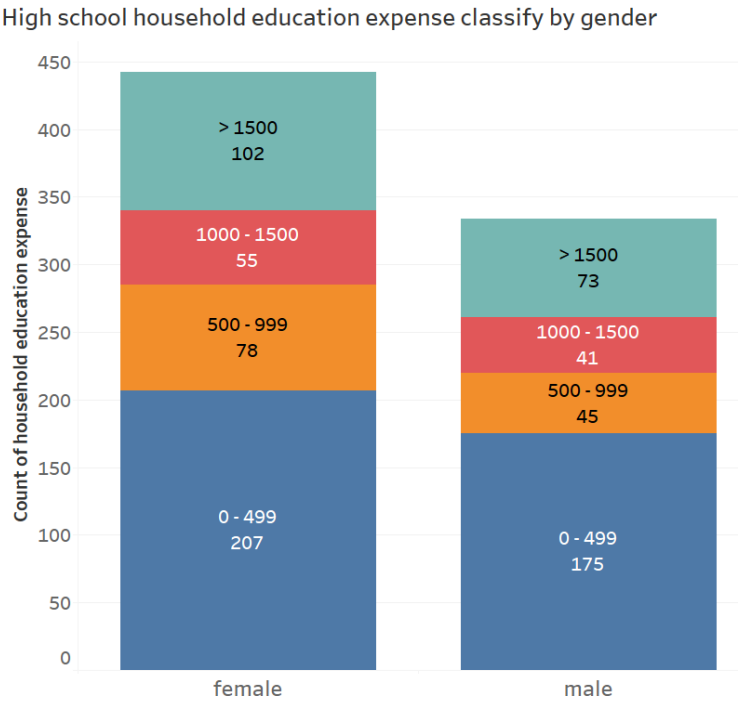


Figure 2



From the two pictures above is the count of household education expenses in each four ranges, which are grouped by gender. From the chart, overall, households spend on male more than females in middle school students. However, households spend more on females than male in high school students. With the exception of household educational expenses, which range from 1000 to 1500 baht, households spend more on female students in middle school. In contrast, household education expenses for females are higher than male in high school in all ranges.

Figure 3

Middle school avg. household education expense classify by parent education levels

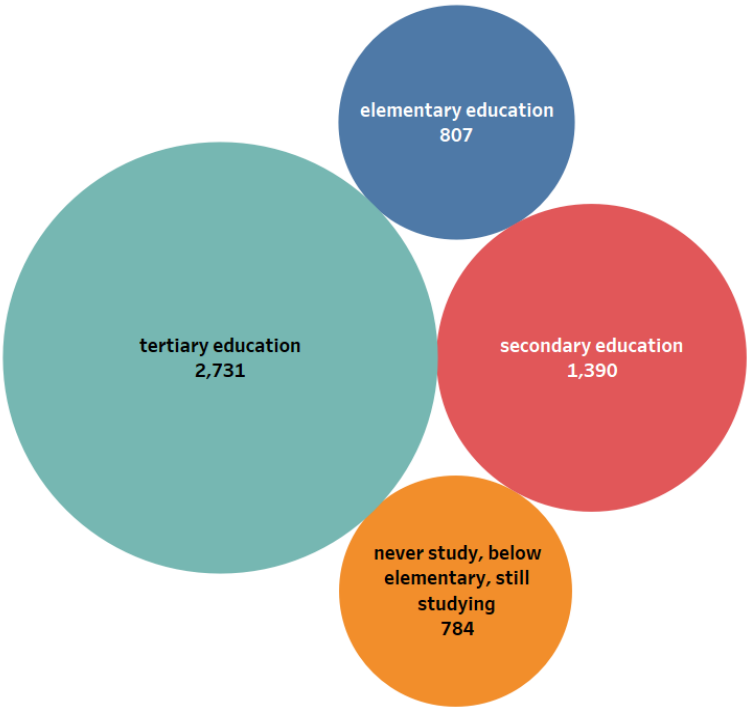
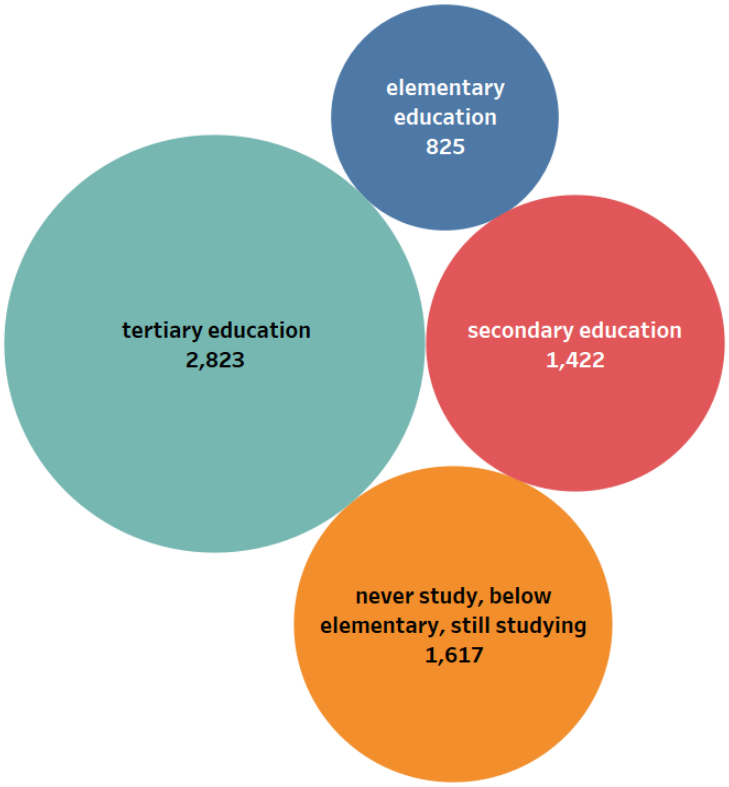


Figure 4

High school avg. household education expense classify by parent education levels



The picture three and four explain the average of household education expenses that are separated by parent education levels. In figure three, it shows that parents who graduate in tertiary education have the highest education expenses on their children. Parents who never study, graduate below primary school or are still studying have the lowest education expenses. This is similar to figure four in that parents who graduate from tertiary education have the highest education expenses. However, the lowest education expenses is from element education, which is different from figure three. This may be because of the outlier data in high school students that can increase the average of parent education in group one.

6. Result

Middle school

Table 1 : binary logistic regression of middle school

```
Iteration 0:   log likelihood = -995.40967
Iteration 1:   log likelihood = -912.20341
Iteration 2:   log likelihood = -910.37724
Iteration 3:   log likelihood = -910.37205
Iteration 4:   log likelihood = -910.37205

Logistic regression                                     Number of obs =  1,472
                                                        LR chi2(13)   = 170.08
                                                        Prob > chi2   = 0.0000
Log likelihood = -910.37205                             Pseudo R2     = 0.0854
```

outcome_2012	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
hexp_2010	.192903	.0408001	4.73	0.000	.1129363	.2728698
gender	.6407152	.114202	5.61	0.000	.4168834	.864547
area	.4330994	.1417774	3.05	0.002	.1552208	.7109781
region						
2	.2160335	.197625	1.09	0.274	-.1713045	.6033714
3	1.147394	.2292583	5.00	0.000	.6980561	1.596732
4	1.205817	.2127149	5.67	0.000	.7889035	1.622731
5	1.005284	.2475235	4.06	0.000	.5201473	1.490422
pa_edu						
2	.0501447	.1606234	0.31	0.755	-.2646714	.3649609
3	.2471188	.1883637	1.31	0.190	-.1220672	.6163049
4	1.194363	.2379147	5.02	0.000	.7280588	1.660667
pa_jloss	.4527478	.2167997	2.09	0.037	.0278282	.8776674
pa_sav	.2151955	.1688493	1.27	0.202	-.1157431	.546134
hdebt_2010	-.0006914	.0008561	-0.81	0.419	-.0023694	.0009865
_cons	-1.673589	.3101252	-5.40	0.000	-2.281423	-1.065754

Table 2: Marginal effect of middle school

	dy/dx	Delta-method std. err.	z	P>|z|	[95% conf.	interval]
hexp_2010	.041541	.008568	4.85	0.000	.0247481	.0583339
gender	.1379757	.0235988	5.85	0.000	.0917229	.1842284
area	.0932664	.0301844	3.09	0.002	.034106	.1524268
region						
2	.047464	.042894	1.11	0.268	-.0366067	.1315347
3	.2491155	.0465859	5.35	0.000	.1578087	.3404223
4	.2606727	.0431013	6.05	0.000	.1761956	.3451497
5	.2201931	.0513804	4.29	0.000	.1194893	.3208969
pa_edu						
2	.0113325	.0363324	0.31	0.755	-.0598776	.0825427
3	.0553161	.0421741	1.31	0.190	-.0273435	.1379758
4	.2398966	.0448751	5.35	0.000	.151943	.3278503
pa_jloss	.0974976	.046429	2.10	0.036	.0064983	.1884968
pa_sav	.0463416	.0362836	1.28	0.202	-.024773	.1174561
hdebt_2010	-.0001489	.0001842	-0.81	0.419	-.0005099	.0002122

High school

Table 3 : Multinomial logistic regression of high school

```
Iteration 0:   log likelihood = -702.80135
Iteration 1:   log likelihood = -624.58568
Iteration 2:   log likelihood = -616.95706
Iteration 3:   log likelihood = -616.55522
Iteration 4:   log likelihood = -616.55326
Iteration 5:   log likelihood = -616.55326

Multinomial logistic regression                 Number of obs =     776
                                                LR chi2(26)   =  172.50
                                                Prob > chi2   =  0.0000
Log likelihood = -616.55326                     Pseudo R2     =  0.1227
```

outcome_2012	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
0	(base outcome)					
1						
hexp_2010	.027094	.1371292	0.20	0.843	-.2416744	.2958623
gender	.0103188	.2863224	0.04	0.971	-.5508628	.5715004
area	.1816096	.3544707	0.51	0.608	-.5131403	.8763594
region						
2	.4566925	.631036	0.72	0.469	-.7801153	1.6935
3	.521607	.6919712	0.75	0.451	-.8346317	1.877846
4	.3444548	.6445802	0.53	0.593	-.9188993	1.607809
5	-.1180308	.7015032	-0.17	0.866	-1.492952	1.25689
pa_edu						
2	.3907592	.3806101	1.03	0.305	-.3552229	1.136741
3	.723262	.4539124	1.59	0.111	-.16639	1.612914
4	1.221517	.5478683	2.23	0.026	.1477151	2.295319

pa_jloss	-.9849319	.4262314	-2.31	0.021	-1.82033	-.1495337
pa_sav	-.37823	.4709068	-0.80	0.422	-1.30119	.5447303
hdebt_2010	-.0004988	.0045249	-0.11	0.912	-.0093674	.0083698
_cons	-1.483133	.8024337	-1.85	0.065	-3.055875	.0896078
2						
hexp_2010	.2980477	.071229	4.18	0.000	.1584414	.437654
gender	.8896406	.1739948	5.11	0.000	.548617	1.230664
area	.18387	.2189886	0.84	0.401	-.2453398	.6130797
region						
2	-1.213849	.3538134	-3.43	0.001	-1.907311	-.5203877
3	-.6236661	.3742427	-1.67	0.096	-1.357168	.1098361
4	-1.337818	.3548267	-3.77	0.000	-2.033266	-.6423705
5	-1.082598	.3724436	-2.91	0.004	-1.812574	-.3526216
pa_edu						
2	.4133353	.2175208	1.90	0.057	-.0129977	.8396684
3	.5321454	.2644019	2.01	0.044	.0139272	1.050363
4	1.070277	.3333841	3.21	0.001	.4168557	1.723697
pa_jloss	-.3228467	.3182571	-1.01	0.310	-.9466192	.3009258
pa_sav	.5331615	.2324385	2.29	0.022	.0775905	.9887325
hdebt_2010	.004162	.0025067	1.66	0.097	-.0007512	.0090751
_cons	.0894639	.4890318	0.18	0.855	-.8690208	1.047949

Table 4: Marginal effect of high school (attend to university outcome)

	Delta-method dy/dx	std. err.	z	P>|z|	[95% conf.	interval]
hexp_2010	.0596564	.0128656	4.64	0.000	.0344403	.0848725
gender	.180677	.0313927	5.76	0.000	.1191484	.2422056
area	.0307055	.0419863	0.73	0.465	-.0515861	.112997
region						
2	-.2641963	.0623587	-4.24	0.000	-.3864171	-.1419755
3	-.1402276	.0661586	-2.12	0.034	-.2698961	-.0105591
4	-.2857499	.0623422	-4.58	0.000	-.4079384	-.1635614
5	-.2147952	.0672268	-3.20	0.001	-.3465573	-.0830332
pa_edu						
2	.0744434	.0434125	1.71	0.086	-.0106436	.1595304
3	.0861653	.0526025	1.64	0.101	-.0169336	.1892643
4	.1699914	.062788	2.71	0.007	.0469291	.2930537
pa_jloss	-.0292848	.0596418	-0.49	0.623	-.1461806	.0876111
pa_sav	.1224945	.0446849	2.74	0.006	.0349136	.2100753
hdebt_2010	.0008655	.0004713	1.84	0.066	-.0000582	.0017892

Note: dy/dx for factor levels is the discrete change from the base level.

Because this research apply the data from the SES panel from 2010 to 2012, the sample may be reduced. High school requires three years of study. As a result, we cannot predict whether they will continue their education at a higher level or not. As a result, I removed several samples that weren't selected for this research.

The first table shows the coefficient result. Household education expenses have a positive relationship with the likelihood of high school attendance, and it is significant. Gender is also significant, and compared to men, females are a greater probability to attend high school. The area variable is significant, which means urban areas have more chances to attend high school than rural areas. All of the regions, except central excluding Bangkok and perimeter, are significant meaning that these regions have more opportunity to attend high school than Bangkok and perimeter regions. Only parents who graduate from tertiary education are significant in the parent education variable. The coefficient is positive, parents who graduated from a tertiary level have a higher chance to attend high school compared to parents who never study. Parent job loss is also significant, as employed parents have a higher opportunity to attend high school compared to unemployed parents. However, parent education savings and household debt are not significant.

The second table shows the outcome of the marginal effect. According to the table, a 1,000 baht increase in household education expenses can increase the probability of high school attendance by 4 percent. Compared to men, women have 14 percent more opportunity to attend high school. All regions have a higher percentage of the probability of high school attendance compared to Bangkok and Perimeter, which Northeast is the highest at 26 percent. Parents from tertiary education have higher 24 percent for the probability of high school attendance compared to parents who never study, lower than elementary or still studying. When compared to parents who have no job, students who have employed parents have a 10% higher chance of attending high school.

The results of high school students are shown in the third and fourth tables. From the third table, because of the lack of data on vocational education outcomes, most of them are not significant. In university outcomes, household education expenses are significant, which has a positive relationship with university attendance compared to not attending cases. Gender is also significant, females have a higher probability to attend university than males relative to not attending case. The area is not significant. In the region, all of them are significant. From the

coefficient, all-region have a lower probability to attend university than Bangkok and the perimeter region relative to not attending case. Northeast has the lowest chance of attending university compared to Bangkok and Perimeter relative to not attending case. The categories in parent education are all significant, in which all categories have a higher probability to attend university relative to not attending than parents who never study, lower elementary, or still studying (base category). Moreover, parents who graduated from tertiary education have the highest probability of attending university compared to the base category. Parent job loss is not significant. Parent education savings is significant, in which students whose parents have education savings have a higher chance to attend university than parents who do not have education savings compared to not attending. Household debt is also significant. Household debt has a positive relationship with university attendance compared to not attending case.

The fourth table shows the marginal consequence of high school students. Increasing one thousand baht in household education expenses can increase 6 percent in attending university relative to the not attending category. Females have 18 percent more likely to attend university than male. In the region, Northeast has 29 percent less likelihood to attend university compared to Bangkok and the perimeter. In parent education, parents who graduated from tertiary levels are the highest, which is 16 percent higher for the probability to attend university compared to the base category. Parents who have education savings have 12 percent higher in the probability of attending university compared to parents who do not have education savings. In household debt, the increase of ten thousand baht in household debt can increase 0.08 percent in the probability of attending university.

7. Discussion

There is some evidence to support the results from the regression result. Household education expenses can increase the opportunity of attending high school and university, which appears the same result in Desai & Veenakulkarni (2008). This might be as a result of parents enrolling their kids in private tutoring or purchasing educational materials that will boost their likelihood of attending school. According to previous research, having a private tutor can improve the chances of enrolling in a university, Abenova & Hajar (2021). The existence of a computer at home can improve student performance. However, due to the error in panel data, the result of the region variable in middle school data does not match other papers. In comparison to

other regions, Bangkok has a relatively low proportion of female residents. Additionally, the regression result indicates that gender affects school attendance. Bangkok may have the lowest likelihood of attending school because of this.

The outcome of the region variable for high school is consistent with Wongsurawat (2010), who found that the Northeast had the lowest school attendance. According to NSO data, the Northeast has the highest percentage of poor people, measured in terms of consumption expenditures, in between the years 2011 and 2017. Bangkok, which has the lowest percentage of the poor, is the opposite of this. Additionally, I discovered from the study that Bangkok has the highest average household education expense, at 3557.81 Baht, as opposed to Northeast, which has the lowest average household education expense, at 919.81 Baht. As a result, the Northeast has the greatest percentage of the poor, which leads to spending the least on education. As a result, Northeast has the lowest university enrollment.

The gender variable's outcome corresponds to the study of Tharmmapornphilas (2013). Additionally, from 2010 to 2021, females enroll at higher rates than males in upper-secondary and tertiary education, according to UNESCO data. According to Knodel (1997), girls are more responsible than boys and are more likely to succeed academically. The increase in household debt of 10,000 Baht has the opposite effect from Zhan & Sherraden (2011) research. This may be because, from the descriptive statistic, the education expense at university is higher than in high school. Some households might not have enough money to send their child to university. Therefore, student loans may be another option that students can get into university, but they can raise household debt. Also, Tangkitvanich et al. (2010) found that student loans can increase student enrollment in poor households in Thailand.

Parent education also has the same result as the previous study. The reason to support this is that parents who graduate from higher education already have experiences, which can guide their children to attend higher education levels as well. Also, Tharmmapornphilas (2013) explains that parents who have more education are more aware of the advantages of education for their children, and they believe that the future benefits are higher than the cost. Therefore, parents who are more educated are more eager to support the education of their children. Parent job loss also has the same result as the previous research. Students whose parents are unemployed have lower chances to attend high school because of income deficiency, unemployed parents may not have enough income to send their child to school, Coelli (2011).

Varughese & Bairagya (2021) found a similar outcome for the area variable. Compared to urban areas, rural areas have fewer teachers and lower-quality schools. According to Tangtipongkul (2015)'s findings, rural regions have a lower rate of return to schooling than urban areas by approximately 8%. Due to lower educational returns in remote areas, parents may have less motivation to bring their children to school, which results in a lower rate of school attendance than in urban areas. Savings for parent education, the last variable, showed results similar to Song & Elliott (2012). Due to a positive psychological effect, students whose parents have education funds have a better likelihood of attending university. Future education investments may raise children's expectations, which may inspire them to work harder to achieve their objectives and improve university attendance, according to Song & Elliott (2012).

8. Limitation

There are two limitations in this research. The first limitation is the error in panel data. This error occurs in the region variable in middle school data leading to misleading interpretation of the result. The result shows that students who live in Bangkok have the lowest probability to attend high school, which is not reasonable. Therefore, I have looked back at the data. From the data, Females who live in Bangkok are only 97 people compared to other regions, which is about 200 to 300 people. Moreover, gender has an impact on high school attendance, in which females have a higher probability to attend high school. Therefore, this may be the reason that Bangkok has the lowest probability to attend high school. Panel data is used to examine how the same data changes over an extended period, which makes the problem possible. The second limitation is the result of vocational education. As you can see from the result, most variables are not significant because few students attended vocational education in the year 2012, which I cannot interpret and analyze the results.

9. Implication

For further research, I would suggest looking more into school variables for example school types, teacher quality, school equipment, etc. These variables can have an impact on school attendance as well. The government has already implemented a fifteen-year free basic education scheme, although parents still have to pay for some private extra expenses, particularly at the higher levels of education. As a result, I would like to recommend two policy implications

to the government or other relevant institutions. The first recommended policy, the government may focus more on demand-side financing policy, in which the government can allocate subsidies to individuals or students directly. With this policy, it may help to boost the attendance rate. Moreover, I would suggest that the government may focus on males who live in rural Northeast regions because this target group has the lowest probability of attendance. In the second policy, the government may address the children's development account, especially for students who want to attend university. A children development account is a parent savings account for their children. I recommend this policy because parent education savings also impact the probability of university attendance based on the result. The government may focus on males who live in rural Northeast regions because this group has the lowest probability of attendance, which is the same as policy one. From this policy, the government can give the first grant to parents who register to increase the incentive. Moreover, the government can provide additional contribution grants according to the children's age range as higher education needs more education savings.

10. Conclusion

Education is essential, and investing in it might improve your future benefits. However, fewer students attend classes at higher levels of education to study. This is due to the rising expense of higher education, which some families cannot afford. Additionally, one of the significant sources of funding for students is household education expenses. This is the reason I research this topic.

This research uses data from the SES panel in the year 2010 and 2012 from NSO. I use data in the year 2010 for independent variables, and I use data in 2012 for the outcome. Therefore, I can analyze the outcome of the same person in different periods. There are eight independent variables in this study. The dependent variable is the attendance rate. This study uses binary logistic regression and multinomial logistic regression to analyze the data.

In the descriptive statistics part, household education expenses and household debt in 2012 are higher compared to the year 2010. Moreover, household education expenses and household debt of high school students is higher than middle school students for students who attend high school and university. According to the regression results, raising household education spending can improve the likelihood that children will attend in both high school and

university since more students can access higher education as a result of higher spending on education. Students can access educational resources and learn more.

Some parent-background factors may have an impact on the likelihood of attendance. Females are less unlikly to attend both high school and university. Higher parental education correlates with a higher likelihood that students will enroll in both high school and university. Compared to parents who are not working, children are more likely to attend high school if their parents are employed. In addition, parents with education savings had a better chance of their children attending university than parents without education savings. This study's limitation is the errors from panel data. To enhance the attendance rate in Thailand, the government may address demand-side financing schemes and the children development accounts, particularly for males who reside in the rural northeast area.

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