The Changes of Factors Affecting the Demand for Higher Education from 2000 to 2010: Evidence from the Population and Housing Census in Thailand

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Abstract

The purpose of this paper is to study the changes of factors affecting provincial disparities regarding the demand for higher education in Thailand using quantitative analysis. In this research, the model was estimated with cross-sectional data from the Population and Housing Censusin 2000 and 2010 considering a wide range of economic, social and educational independent variables. The result shows that, firstly, the average monthly household income positively affects the demand for higher education for both 2000 and 2010. Secondly, the educational facilities factors such as university proximity (university access) are positive significant association with the number of university students per 10,000. Thirdly, the influence of parent educational background has a positive effect the demand for higher education in 2000 but not in 2010.Therefore, it could be explained that, in 2010, other factors might have a higher impact on the level of educational demand compared to parent educational background. Finally, we derive some conclusions about determinants of the demand for higher education in Thailand, and propose some remarks for future research.

**Keyword:** higher education, disparities, population, and housing census

1. Introduction

Over the last three decades, the number of Thai students pursuing a four-year university education have significantly increased. According to the information provided in the UNESCO Institute for Statistics (UIS), the gross enrolment rate of higher education had jumped from about 21.2 percent in 1998 to 50 percent in 2010. Owing to free tuition for 12 years basic education in the 1999 National Education Act., the number of high school students had increased.

However, the statistical record data from the Population and Housing Census between 2000 and 2010 shows that the demand for higher education among the provinces had increased. Figure 1 shows an increasing number of university students per 10,000 persons aged 18-21. The number of university students increased from 1.44 million to 1.55 million between 2000 and 2010. However, the number of university students are different among the provinces. Bangkok and surrounding provinces, which have a high-income levels, have a higher number of university students per 10,000. On the other

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hand, Sakon Nakhon, Mae Hong Son, Nakhon Phanom, which have a low-income levels, have a lower number of university students per 10,000.
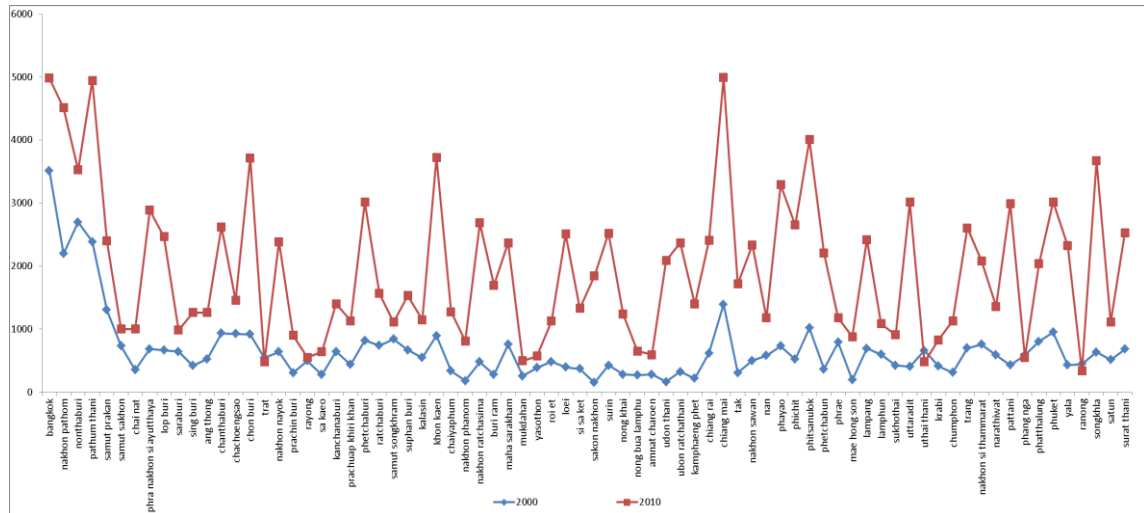
Source: the Population and Housing Census (2000 and 2010)

Figure1 The number of university studentsper 10,000 persons aged 18-21 by province

The decision to enroll in the higher education is important because a bachelor's degree or higher is one of the important requirements to find work in Thai community. The more education a person receives, the greater income they get. However, the difference of percentage of students enrolling in higher education institutions shows an unequal opportunity among students. To reduce these disparities, this study explains the factors that affect the demand for higher education among provincial context.

Research Objective

The objective of this research is to compare the factors that affect the demand for higher education from the viewpoint of regional disparities between 76 provinces in Thailand between 2000 and 2010.

Scope of this research

The scope of this research focused on university students' age (18-21 years old) who were studying in 4 years program in 2000 and 2010. The Population and Housing Census in 2010 covered 77 provinces including Bangkok. The statistical data of Amnat Charoen province is not available in 2000 because Amnat Charoen province was separated from UbonRatchathani province in 1993. This study included Amnat Charoen province into UbonRatchathani province to compare the changes of demand for higher education between those 2 years.

In addition, students who are attending the university aged over 21 or under 18 are excluded. As a result, the estimated values are underestimated compared to the real number of students who are studying in the universities.

Literature review

The literature review provides an understanding of the regional differences in the entrance behavior and analytical methods. Many researches on higher education enrolment are founded upon the factors of regional disparities of the entry behavior by using provincial data. The literature reviews are discussed below.

Arai (1995) explained abo individual decisions on higher education in men and women's university entrance behavior, and women's college entrance behavior by using prefecture-level data in Japan. Independent variables are household income, proximity to a higher education institution, vocational school, father's educational attainment, mother's educational attainment, parents' occupations, proportion of self-employed rate, big cities dummy. The empirical findings confirmed that father's educational level, income, and occupation have an influence on university entrance behavior of men and women but have no influence on women's college entrance behavior. However, the proximity to a higher educational institution has an influence only on women's college entrance behavior.

Ishikawa (2006) finds that large companies ratio, university capacity, the average salary of a high school graduated have an effect on university enrolment rate by using the internal rate of return approach in Japan.

Tukhtamizaeva and Gamou(2014) presented the factors affecting enrolment in primary education, secondary education and higher education in Uzbekistan. As compared with primary education, GDP per capita has an effect on the enrolment rate in secondary education, and the average age of first marriage for women has an effect on the enrolment rate in higher education.

Wongbhuddha (1971) examined the factors influencingchoice of work or post-compulsory level education of young people in rural areas by using provincial level data in Thailand. According to the result of factors analysis, household income, father's occupation, the number of siblings have an effect on enrolment decision.

Methodology

A. Data collection

We employ a mainly four data sources: (a) Population and Housing Census carried out by National Statistical Office (NSO); (b) Household socio-economic survey carried out by NSO, (c) Commission on Higher Education carried out by Ministry of Education (MOE); (d) Labor force survey carried out by NSO, which provide information in both 2000 and 2010. Table 1 shows the definition, source and acronym of all variables.

Table 1   Variable Definitions and Sources

Dependent variable	Acronym	Definitions	Unit	Source
The number of university students per 10,000	UER	Numerical value obtained by dividing the number of university students of 4 year program per 10,000 people in the university-age population(18-21)	person	Population and Housing Census (2000,2010)
Independent variable	**Acronym**	**Definitions**	**Unit**	**Source**
Income	INC	The average income per household (monthly)	baht	The household socio-economic survey(2000,2010)
School access	SPA	Number of High school per 10 km^2	school/area	Commission on Higher Education (2000,2010)
University access	UNA	Number of national and private universities per 100 km^2	school/area	Commission on Higher Education (2000,2010)
Rajabhat university dummy	RAJ	Rajabhat university in each province (Yes=1, No=0)	-	Commission on Higher Education, MOE (2000,2010)
Parents education	EDH	average years of education of 40-59 year-olds population	year	Labor force survey (2004,2010)
Number of students per teacher	NST	Number of students per classroom	person	Commission on Higher Education (2000,2010)
Tutoring center dummy	TTC	tutoring center in each province (Yes=1, No=0)	-	Wannasorn website(2000,2010)
Unemployment rate	UNE	the percentage of the unemployed in the labor force	%	Labor force survey (2000,2010)

B. Model

The various statistical data have been applied to accomplish the objectives of this research. By using various variables as mentioned above, we examined the relevance of the number of

university students per 10,000 in each province and other variables by using cross-sectional data analysis (2000 and 2010).

First, a standard *cross-section model* is used to examine the relationship between the number of university students per 10,000 and others variable in each year:

$$Y_i = \alpha + \beta_1 INC_{1i} + \beta_2 SPA_{2i} + \beta_3 UNA_{3i} + \beta_4 RAJ_{4i} + \beta_5 EDH_{4i}$$
$$+\beta_6 NST_{5i} + \beta_7 TTC_{6i} + \beta_8 UNE_{8i}+\varepsilon_i$$

where Y_i is the natural logarithm of the real value of the number of university students per 10,000 for the ith (i=1,…,n). The term of ε_i is the error term. We estimated the variances of OLS estimators by using robust standard error (heteroscedasticity).

The expected signs of the coefficients are as follows.

(1) Economic factors

    a)   Income

Household income might matter for university enrollment decision because of credit constraints. Children of higher income parents are more likely attend the higher education than children of lower parents (Arai1995; Wongbuddha 1971). Poor students are more likely to have to work or care for their family members. On the other hand, not only students from socio-economically advantaged families don't have to worry about their financial status, but also they can attend other activities such as language, computer classes and tutoring center outside of school. Therefore, we predicted that household income may have a positive effect on the demand for higher education.

    b)   Unemployment rate

We can expect that the sign of Unemployment rate coefficient will be plus because high unemployment rate means that the excess supply occur in the labor market. Therefore, students choose to go to higher education institutions instead of working (Yano, 2006).

(2) Educational facilities factors

    a)   Number of students per teacher

Much of the previous research stated that the number of teacher or the class size could affect the student's achievement. This research used the student/teacher ratio as the class size. If we assume that that the number of teacher or the class size could affect the student's achievement, the lower student/teacher ratio or the smaller size of class affect the student's ability, we will be expected that number of students per classroom has an impact on demand for higher education. However, educational facilities such as school building area per student, class size had no effect on enrollment rate for medical school in Japan (Seno, 2003). In other word, the demand of medical education depends on other factors such as student's performance or parents.

    b)   School access and University access

Arai (1995) reports that the proximity to college campus has positive effect on a student's decision to attend college. However, it's just only college attendance decision of women who are affected, but not for university attendance decision of men and women. Also, students who live at a house near the university, not only can reduce transportation cost but also have a more chance to understand the environment of university. Likewise, the more high school number has, the more demand of high school students who want to go to university raise. For this reason, university access, school access or the number of educational institution may have a positive effect on the demand of higher education.

c) Rajabhat university dummy

In Thailand, forty of sixty-four universities that offer education programs are Rajabhat universities (which used to be teacher college) (Atagi, 2011). Rajabhat dummy variable tend to have a positive sign like university access variable. After Rajabhat universities were upgraded from institute to university status in 2004, the number of students who can go to the higher education has increased.

d) Tutoring school dummy

We predicted that Tutoring school dummy have a positive sign in estimation result. Province which has a lot of tutor school is expected to have a high demand of higher education. The concept is the higher income parents earn, the more children have chance to study in tutor school. Moreover, the more children study in tutor school, the more knowledge they get (Konakayama and Matsui, 2008).If high school student need to study at tutor school in order to prepare for University entrance exam, the province which has a lot of tutor school shows a lot of student have desire to entrance the University.

(3) Others

Many studies such as Arai (1995), Wongbuddha (1971) and Baharan (2006) conducted that the influence of parents on their children was important factor. We predicted that parents with higher education not only tend to have a higher earnings but also give an advice or recommendation for their children as well.

C. Data analysis

The descriptive analysis has been done to know the proportional distribution among demographic variables. In order to identify the relationships between all 8 factors (independent variables) and the number of university students per 10,000 (dependent variable), multiple regression analysis were performed. From the sample 76 provinces, the research finding were concluded and categorized into 2 parts; 1. Descriptive statistics of all variables which are shown in table 2; 2. Cross-section analyses which were shown in table 3.

Results

Table 2 shows descriptive statistics on the cross-sectional data that presented in a previous section with 76 provincial observations. The mean value of the number of university students is 669 persons in 2000 and 1941 persons in 2010. The mean value of the average monthly income per household is 10627.33 baths in 2000 and 20845.95 baht in 2010.

Table 2 Descriptive Statistics for cross-sectional variables (2000 and 2010)

Variable	2000				2010			
	mean	sd	min	max	mean	sd	min	max
The number of university students per 10,000	668.60	553.40	152.29	3514.35	1940.71	1157.80	334.25	5034.87
income	10627.33	4035.32	4826	26909	20845.95	6212.79	9024	48951
School access	0.96	0.07	0.18	4.08	0.96	0.82	0.18	6.11
University access	0.28	0.16	0.001	13.39	0.33	1.84	0.001	15.93
Rajabhat university dummy	0.43	0.50	0	1	0.46	0.50	0	1
Parent's education	7.03	0.80	5.43	10.58	7.21	1.09	5.20	11.44
Number of students per teacher	20.61	2.67	15	27	20.73	4.97	12	42
Tutoring center dummy	0.09	0.29	0	1	0.29	0.46	0	1
Unemployment rate	1.72	0.75	0.50	3.80	0.75	0.48	0.10	2.20
ln(The number of university students per 10,000)	6.30	0.60	5.02	8.16	7.42	0.69	5.81	8.52

Table 2 (continue)

Variable	2000				2010			
	mean	sd	min	max	mean	sd	min	max

ln(income)	9.21	0.34	8.48	10.2	9.91	0.27	9.11	10.80
ln(School access)	-0.23	0.58	-1.70	1.41	-0.25	0.61	-1.72	1.81
ln(University access)	-5.31	2.61	-6.91	2.59	-5.21	2.7	-6.91	2.77
Rajabhat university dummy	0.43	0.50	0	1	0.46	0.50	0	1
ln(Parent's education)	1.94	0.11	1.69	2.36	1.96	0.14	1.65	2.44
ln(Number of students per teacher	3.02	0.13	2.71	3.30	3.01	0.23	2.48	3.74
Tutoring center dummy	0.09	0.29	0	1	0.29	0.46	0	1
ln(Unemployment rate)	0.45	0.46	-0.69	1.34	-0.46	0.61	-2.30	0.79
The number of observations		76				76		

Table 3 shows the regression analysis results in which all 8 factors were regressed with the dependent variable of the number of university students per 10,000.Income per household has found to be the positive influential factor in determining the number of university students per 10,000 in both 2000 and 2010. It means a ten percent increase in average income per household correlates with 7.7 percentage point and 5.1 percentage point increase in the probability of the number university students in 2000 and 2010 respectively. *University access has a significant positive on* the demand for higher education in 2000 and 2010. Parent's education is statistically significant factors in only the year of 2000.On the other hand, Tutoring center dummy were found significantly influence the demand for higher education in only the year of 2010. The positive coefficient on tutoring center dummy means the probability that a province which has a tutoring center is 45 percentages point greater than a provinces which has not a tutoring center. Although in 2010 the coefficient of the average income per household has decreased, we found that educational facilities factors (university access, tutoring center dummy) have a higher impact on the demand of higher education compared to 2000.

Table 3 cross-section estimation

Variable	2000		2010	
	coefficient	p value	coefficient	p value
Income	0.773***	0.001	0.510*	0.056
School access	0.093	0.206	-0.117	0.277
University access	0.286*	0.059	0.339**	0.017
Rajabhat university dummy	-0.072	0.701	0.069	0.480
Parent's education	0.405*	0.087	0.575	0.304
Number of students per teacher	-0.289	0.941	-0.444	0.173
Tutoring center dummy	0.243	0.311	0.446**	0.021
Unemployment rate	-0.180	0.085	-0.098	0.356
Constant term	-2.577	0.093	1.856	0.400
Adj. R2	0.626		0.636	

***P<.01, **P<.05, *P<0.1

Discussion

Our study, based on the Population and Housing Census data, investigates those factors that affect the number of university students per 10,000 to improving our understanding of the changes in the demand for higher education in 10 years. After analyzing the explanatory variables, among its findings are the following:

First, as previously researched by Arai (1995) and Wongbhuddha (1971),the average of monthly income per household factors, this paper found that given the increase in the demand for higher education. The income of parents rises, the chance of their children to get higher education increases. However, the importance of average of income per household leads to decrease the demand for higher education in 2010. It can suggest that in 2010. Other factors, such as an expansion of higher education institution, become important.

Second, almost educational facilities factors are positive significant for the number of university students per 10,000, but only university access has an effect on increasing the number of university student in both of those two years. This result confirmed that the location of the university near home is important criteria for student's enrollment decision, as explained by Arai (1995) and Farhan et al. (2012). Moreover, this paper found that tutoring center dummy has an influence on the number of university students per 10,000. Thus supporting the finding of Konakayama and Matsui (2008).The provinces which have a tutoring centers have a higher number of university students. Perhaps, the other tutoring centers also opened following the famous tutoring center. In addition,the number of students who attend the tutoring centre increased from 403,846 students in 2009 to

572,131 students in 2011 (Educational Statistic in Brief 2009, 2011).Thirty percent of the number of university students had attended the tutoring centre.

The third important factor is the parent's education. They also play an important part in determining children's decision. Generally, parents' good or bad word of mouth could make it very worthwhile for any student decision (Farhan et al., 2012). So, it can be assumed that parents who graduated from the university tend to share their experience about university life more than parents who didn't graduate from the university. As a result, the students who have received information about higher education tend to have higher motivations to go to the university more than the students who didn't received information. In addition, not only an average year of education year of parents but also the types of occupations have an effect on their children decision (Wongbhuddha, 1971). However, an average year of education of parents is increasingly assigned to the demand for higher education in only 2000. It can be assumed that other factors, especially educational facilities factors, become more important than parents education.

This study concludes that there are multiple factors that are affecting the demand for higher education. The objective of the study is not only to explore the factors affecting the demand for higher education, but also to investigate the changes of those factors during 10 years by applying cross-sectional analysis to find out the relation among them.

Future research

It is necessary to remark that the result of this research is difficult to understand in individual enrolment decision because this research used macro data. To understand people's decision making we need to consider the micro prospective such as student or teacher's opinion by using questionnaires or interviewed. Moreover, several data constraints and limitations are worth mentioning. An analysis of this paper is scoped in 2000 and 2010, it was carried out only individual effect but time effect was ignored. However, it is possible to say that people's preference or taste can be changed by changing in the economic structure at various times. Therefore, we should construct the model that includes time effect dummy in the future.

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