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# The effects of governmental subsidy on the quality of education in Taiwan's private universities and colleges

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**Abstract.** The government arranges subsidies for private colleges annually with excellent academic performance. In order to justify if government subsidies can enhance the quality of education, this paper will investigate the relationship between governmental subsidy and education quality of Taiwanese private universities and colleges through data envelopment analysis and regression analysis on research data. Empirical results for the principles of the current government allocation of funds to provide advice, expect to enhance the quality of education, more limited government resources for the best allocation.

**Keywords:** governmental subsidy; educational quality; DEA

## 1 Introduction

In view of the need for innovation and knowledge in the 21st century, countries around the world have been actively nurturing talents and this task has inevitably fall into the hands of universities around the world. Universities have become the place for competing for knowledge, innovation and human resource, thus causing the competitiveness of a country's university to be the index for the country's national competitiveness. Development of higher education in Taiwan has gone from 4 universities in 1949 to 163 universities in 2011 and total number of students has also increased from 5000 to 1,340,000. There are 54 public universities (33.13%) with 440,000 students (33.84%) enrolled in it and 109 private universities (66.87%) with 900,000 students enrolled (67.16%) (Ministry of Education Statistics 2011). These facts have shown the intention by the Taiwan government to provide better educational advancement path and higher education for more Taiwanese citizens. However, the Taiwan government is concerned if the quality of education provided to the students is able to be kept at a high level.

Article 13 of the Taiwan fundamental law of education states that "The government and the people may conduct education experiments as needed and strength research and assessment of education to improve education quality and promote education development." C.S. Wu feels that improving the quality of education not only fulfills the demands of the society, but also ensures the

competitiveness of the schools is maintained at a high level, proving the importance of education quality [16].

Geuna and Martin pointed out in their studies that universities in Europe and Asia-Pacific are given subsidies based on the results of their performance appraisal [4]. The Taiwan government has adopted the “Private School Law” to improve the quality of education in private colleges and reduce the advantage in resources available that public colleges have over private colleges. The government also arranges subsidies for private colleges annually and offers scholarships to students with excellent academic performance. Annual subsidy for private colleges has increased by 46.43% over the years, from NT\$ 4.7 billion in 1996 to NT\$ 6.9 billion in 2009. However, there has been a lack of literatures discussing if the subsidies are beneficial for improving education quality.

There are many papers in Taiwan discussing about the education quality in Taiwan. There are papers discussing about education quality assurance [12] [1] [8] [15] [5] and theory to education quality [16] [17] [2] [3] [14]. However, there is a lack of papers verifying the effect of government subsidies has on education quality. Therefore, this paper will perform research on Taiwan private universities and discuss about the relationship between government subsidy and education quality.

## **2 Literature Review**

### **2.1 Reward, Subsidy revenue**

According to “Implementation Regulations for Establishing an Accounting System Regarding School Endowment Corporations and Private Schools” and “Regulations under the agreement for Establishing an Accounting System Regarding School Endowment Corporations and Private Schools”, schools that have accepted donations and subsidies from government agencies, local organizations or individuals have to be categorized by the school as “revenue from donations and subsidies”. Subsidies from government agencies have to be further categorized as “subsidy revenue” and donations from foreign government agencies, local organizations and individuals have to be further categorized as “donation revenue”.

The Ministry of Education in Taiwan has set the working standard for the audit of rewards and subsidies for private schools. The grant of rewards is evaluated based on the performance, administrative operations, school-running character, reward implementation performance and policy performance. Subsidies are divided into school size subsidy and overall resource subsidy. The 2011 Ministry of Education award for administrative Affairs in Private Schools development plan states that subsidies takes up 20% of the total funds and rewards takes up 80% of the total funds. This shows that the Ministry of Education are emphasizing on school performance, causing every university to perform at its best to obtain the rewards. Schools can use this as an evidence of excellent school performance and attract students to enroll.

Lai Y.U., Hu W.H., Kuo C.J. pointed out in their research that the better the school performance of private universities, the more the government subsidy will be and these lead to more disclosure of financial information. [7] Therefore, there is a

positive relationship between school performance of private universities and government subsidies. Moreover, financial information disclosure of private universities and colleges also has a positive relationship with government subsidies.

## **2.2 Endowment**

Research results by Lin C.L., Ho Y.c has shown that there is a positive correlation between information transparency and endowments and there is a negative correlation between endowment and financial manipulation. [10] Therefore, higher transparency of financial information results in lesser chance of mismatch in endowment records due to the positive correlation of the two. However, higher level of financial manipulation will cause a negative perception from donors and potential donors due to the negative correlation.

Lai Y.U., Hu W.H., Kuo C.J. pointed out in their research that private universities and colleges performance does not have a significant correlation with private donations and financial records have shown that private donations have not reached a significant level for private universities and colleges. [7]

It is a common for large scale organizations to attract people for private donations due to their access to more resources allowing them to easily become the concern of the public. Lin C.L., C.C. Hsieh feels that the scale of the organization will affect the endowments of not-for-profit organizations. [9]

## **2.3 Education Quality**

Sallis feels that it is difficult to judge the quality of education because quality of education is a subjective concept. [11] Juran pointed out that education quality is the requirement for achieving the final objective of education and fits the requirement of legal law. [6] It allows the students receiving the education to be effective in their production and services in the work force.

Wang R.J. thinks that in addition to teaching and research, higher education quality standards should also include administrative and management activities of the university.

The current trend in colleges is being able to provide functions that focus on teachings, researches and services. Therefore, Wu C.S. reckons that education quality should be judged by “learning quality”, “teaching quality”, “administrative quality”, “environment quality”, “research quality” and “social service quality”. [16]

Yang F.F., C.Y. Huang performed regression analysis using variables such as ratio of teachers with doctorate title, number of publications by department teachers, faculty academic research funds, student-teacher ratio, amount of resources in the library per students and equipment funds per student. [13]

### **3 Research Methods**

#### **3.1 Data source and sampling**

The main objective of this paper is to discuss the relationship of Taiwanese private university subsidy and education quality. The data source will come from the official website of Ministry of Education and the financial statement page of various universities. Source of the data comes from 109 private universities and data will 2006 till 2008 will be sampled. There will be a total of 309 data samples excluding incomplete data.

#### **3.2 Variables**

##### **I. Subsidy**

All subsidies should only be used by the school and the main source of the subsidies comes from government agencies. Data for this subsidy can be acquired from financial reports made public by the school's accountant.

##### **II. Education Quality**

Judgment of education quality is difficult because education quality is a subjective concept. [14] This paper uses data envelopment analysis and judge the education quality based on concepts coming from the first article of University Act, "Universities shall encourage academic research, cultivating talent, enhancing culture, serving society and accelerating the development of the country." Therefore, factors used to judge the quality of education includes teaching, research and services. These factors are similar to the indications for evaluation of teachers in every school. For "teaching", number of students will be the measureable variable and for "research", the measureable variable will be the cooperative education revenue from National Science Council and Industry-University research funds. Lastly, the measureable variable for "services" will be the promotion revenue. Judgment concept factors are divided into manpower and funding. The quality and quantity of teachers will be the main factors affecting manpower. Quantity of the teachers refers to the number of teachers with position higher than assistant professors and quality of teachers refers to the degree the teachers hold. Finally, library resources, recurrent expenditures and capital expenditure will be the factors affecting funding.

##### **III. Endowments**

All endowments coming from foreign government agencies, local organizations and individual donations have to be classified as endowments by the school receiving them. The main sources are the founder or affiliated companies and a small portion of endowments comes from alumni and the public. This small portion should be made public on the report by the school accountant.

##### **IV. Scale of the school**

Fang J.J. pointed out the scale of the school will affect the quality of education. [5] Research will be done based on this fact and the scale of the school will be directly proportional to the total assets of the school.

##### **V. Nature of the school**

The schools will be categorized into 1) universities in general and 2) technical and vocational training universities.

#### **VI. Teaching expenditure**

All expenditures used on teaching, research, guidance and discipline will be included and this data shall be made public by the school's accountant.

### **3.3 Assumptions.**

Guena and Martin stated that evaluation results of university performance are used as indications for government subsidy for schools in Europe and Asia-Pacific. [7] Based on the working standards for the audit of rewards and subsidies for private schools by Ministry of Education in Taiwan, 80% of the total subsidy is allocated based on indications such as "university evaluations", "education character", "administrative performance" and "planning and execution of funding". Therefore, if a school is capable of receiving more subsidies, this indicates that they have a better education quality. It can be deduced that subsidy income has a positive correlation with education quality.

#### **Assumption 1**

Taiwan private university's subsidy has a positive correlation with education quality.

### **3.4 Empirical Models**

The model below will be used to verify if the previous assumption stands.

$$EQ = \beta_0 + \beta_1 GSR + \beta_2 DR + \beta_3 Size + \beta_4 TE + \beta_5 SC + \varepsilon$$

In the above model, EQ refers to education quality, GSR is grants and subsidies received from the government, DR is donations received, Size is the size of the school, TE is teaching expenses, SC is the school character and lastly  $\varepsilon$  is error term.

## **4 Empirical results and analysis**

### **4.1 Descriptive statistics and correlation coefficient analysis results**

Table 1 show the descriptive statistics results of each variable. From the table, it can be observed that the mean value for education quality of the private universities is 0.8258. The government subsidy has a mean value of NT\$150,319 thousand. The maximum amount of subsidy is NT\$625,968 thousand and the minimum amount of subsidy is NT\$0. The average amount of endowments is NT\$53,971 thousand, maximum amount of endowments is NT\$625,968 thousand and minimum amount of endowments is NT\$0. The size of the school has a mean value of NT\$4,042,319 thousand. The largest size is NT\$22,345,737 thousand and the smallest size is

NT\$1,046 thousand. The mean amount of teaching expenses is NT\$686,140 thousands. The maximum amount of teaching expenses is NT\$2,310,121 thousand and the minimum amount of teaching expenses is NT\$64,267 thousand.

From Table 1, the average government subsidy of NT\$150,319 thousand for private universities takes up only 21.91% of the average teaching expenses (NT\$686,140 thousand), taking up a small portion of the teaching expenses. Donations from board of directors make up for the majority of the endowments for a newly established university in 2007. The average endowment over the three years is NT\$53,971 thousand and it only makes up for 7.87% of the average teaching expenses (NT\$686,140 thousand), taking up a small portion of teaching expenses too.

**Table 1.** Descriptive Statistics for each variable

Variable	Unit	Min. Value	Max. Value	Mean	Standard Deviation
	NT\$ thous	0.000	625,968		
GSR	and	0.000	3,210,620	150,319.33	118,945.141
DR	NT\$ thousand	1,046	22,345,737	53,970.65	267,512.390
Size	NT\$ thous	64,267	2,310,121	4,042,318.8	4,011,100.692
TE	and			6	453,544.696
SC	NT\$ thous			686,139.98	0.471
	and			1.67	

GSR: Grants and Subsidies Received, DR: Donations Received,EQ: Education Quality  
DEA: DEA efficiency value,Size: Size of the school,SC: School character,TE: Teaching Expenses

#### 4.2 Regression Analysis Results

Table 2 shows the empirical results based on assumption 1. The coefficient after adjustment to regression mode is found to be 0.069 and F value is 5.567 (P value is 0.0000). The standardized coefficient is -0.237 and this shows that Taiwan private universities’ subsidy has a negative correlation with education quality. This result does not match with assumption 1 that “Taiwan private university’s subsidy has a positive correlation with education quality.” This means that higher subsidy from the government does not lead to better education quality.

On the controllable variables, the regression coefficient for donations is 0.028 and this shows an insignificant level. This means that donations do not have a huge influence on education quality. Regression coefficient of school size is -0.252, showing a significant level. This means that the bigger the size of the school, the worse the education quality is. Teaching expenses have a regression coefficient of 0.432 and this significant level means higher teaching expenses leads to better education quality. Lastly, school character has regression value of 0.107 and this value is of low significance. This means that the character of the school has no influence on the education quality.

**Table 2.** Empirical results for regression analysis of independent variables and education quality

Variable	Non-standardized coefficient	Standardized Coefficient	T Value	VIF
Intercept	0.741		13.985***	
Subsidy	-3.490	-0.237	-2.237**	3.702
Donations	1.821	0.028	0.431	1.376
School Size	-1.101	-0.252	-2.800***	2.677
Teaching	1.669	0.432	3.971***	3.907
Expenses				
School	0.040	0.107	1.587	1.491
Character				

Note: R<sup>2</sup> value after adjustment is 0.069. F value is 5.567,  $p < 0.0001$  \* $P < 0.05$ , \*\* $P < 0.01$

## 5 Conclusions and Suggestions

### 5.1 Conclusions

A total of 103 private universities and colleges from 2006 – 2008 are sampled in this research to investigate the relationship between subsidy and education quality. Research results have shown that private universities have negative correlations between subsidy and education quality. This correlation does not match with the assumption that subsidy and education quality has positive correlations and this can be a pondering subject. One of the reasons is there are currently 109 private universities and there are a total of 163 universities including public universities. The intense competition between the universities and the decrease from 300,000 to 200,000 in the number of students enrolling in universities has caused every school to gain crisis awareness. They believe they have to enhance their education quality by recruiting high quality students to improve the performance of the school. Therefore, every school offers hefty scholarships to attract good quality students to the school. Moreover, schools have encouraged teachers and professors to strive for funding such as subsidies from National Science Council and Industry-University Cooperation Funds. Another possible reason is government subsidy does not have a significant effect on the school expenses to improve education quality. The average amount of subsidy per school is NT\$150,319 and the average expenses per school is NT\$686,140. The subsidy takes up 21.91% of the total expenses, showing an insignificant effect on the expenses.

Control variables “teaching expenses” and “education quality” have a positive correlation. “Size of school” and “education quality” has a negative correlation. These conclusions have shown that “teaching expenses” and “size of school” are two factors affecting education quality. Endowments and education quality have shown a negative correlation but the level is insignificant.



## 5.2 Suggestions

### **(1) Review the allocation of funding to gain maximum benefit**

In 2011, the Ministry of Education has split funding into subsidy and rewards. Subsidies are further split into subsidy for size of school and general resources subsidy. These subsidies take up 20% of the total funding. Rewards are split into evaluation performance, school character, administrative operation, reward subsidy operation performance and policy performance. These take up 80% of the total funding. This distribution does not have a significant effect in improving education quality. Therefore, the government has to reconsider the distribution to achieve maximum benefits.

### **(2) Encourage public donations to gain finance**

The paper has shown that donations from the public are relatively low compared to other donations. Every school has to improve their transparency and promote the school's advantage. Schools can also either work together with companies of the same idea or create school enterprises. This will improve the revenue of the school and combine theory with practical work, allowing for a win-win situation.

### **(3) Strengthen financial autonomy to pursue sustainable development**

With the country facing increasingly difficult finance, the government has decreased the subsidies towards higher education. Therefore, Taiwanese universities are encouraged to raise funds to improve the finance of the universities. The best solution is to couple traditional basic researches with consideration for future finance development. Schools should strengthen their applied research field and commercialize the knowledge such as offering short-term professional courses, various job training or technology consulting services. The funding received will be a hefty amount and will be able to compensate for the lack of government subsidies.

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