

China's General Tuition Policy: Evaluation Based on Multilevel Qualitative and Quantitative Analysis Using Fuzzy Logic Models

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How to cite this paper: Zhang, R. (2018). China's General Tuition Policy: Evaluation Based on Multilevel Qualitative and Quantitative Analysis Using Fuzzy Logic Models. *Advances in Applied Sociology*, 8, 598-612. <https://doi.org/10.4236/aasoci.2018.88035>

Received: July 9, 2018

Accepted: August 13, 2018

Published: August 16, 2018

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Abstract

This paper takes the tuition policy of Chinese colleges and universities as the research object, studies the main problems through fuzzy evaluation method, and establishes the index system for the evaluation of tuition policies of ordinary colleges and universities. Based on the index system, this paper makes an empirical research and analysis on the colleges and universities in Shaanxi province. It is found that the main problems of China's colleges and universities' tuition policy are that students and their families have low ability to obtain information related to the tuition policy of ordinary colleges and universities, and the rising tuition fees have had a big impact on whether students can fairly accept higher education opportunities, the objective of the tuition policy of ordinary colleges and universities is not reasonable, and at the same time, the participation of stakeholders in setting the tuition standard of ordinary colleges and universities is less. In view of the above problems, this paper puts forward relevant policy suggestions.

Keywords

Chinese Colleges and Universities, Tuition Policy, Evaluation, Research and Analysis

1. Introduction

In 1986, American education economist D. Bruce Johnstone put forward the famous education cost sharing theory in his *Higher education cost sharing: colleges and universities student funding in the United Kingdom, federal Germany, France, Sweden and the United States*, which has become an important theoretical basis for countries around the world to formulate higher education tuition

policy.

Since 1951, when the American scholar H. D. Lasswell proposed the concept of policy science, the academic and political circles around the world pay more and more attention to policy research. The scope of policy research also extends from policy analysis before decision making to policy formulation, implementation, evaluation and other aspects. Education policy is an important part of a country's public policies. The early evaluation method of education was also based on empirical analysis, which analyzed the cost and benefit of education by using quantitative tools such as experiments and measurement analysis, and placed emphasis on the factual evaluation of education policy outcomes. In the 1980s, with the evolution of the research paradigm of policy assessment, education policy assessment also began to emphasize the demands, interests and feelings of education policy stakeholders. And the evaluation method is developing towards the qualitative and quantitative combination.

In 1997, China's higher education system carried out a charging system. Therefore, individuals bear part of the cost of higher education, which was made to solve the financing bottleneck in the popularization of higher education in China. On the other hand, with the rapid growth of the tuition of Chinese colleges and universities, some poor families are unable to pay the high tuition fees. Dropping out of school or giving up higher education is not uncommon. Chinese colleges and universities tuition fees have brought us some negative effects while bring in a lot of benefits.

In recent years, domestic scholars have carried out researches on the hot issues related to Chinese colleges and universities tuition fees, which are mainly reflected in the following aspects: First, they discussed the rationality of some higher education costs borne by individuals and their families. It is considered that the standard cost per student should be the basis of tuition pricing, and it reflects the necessary consumption of education (Cao, 2014; Ge, 2001; Li & Cai, 2006; Wu, Wu, & Li, 2012). Second, they analyzed the unscientific definition of college cost, the improper increase of cost and the unreasonable share of cost in the context of the rapid increase of colleges and universities tuition fees. These problems are the main causes of the increase of colleges and universities tuition fees (Lu & Zhong, 2002; Luo & Zheng, 2018). Third, on the basis of analysis, scholars mainly discussed the definition of higher education cost and specific cost accounting items, and they proposed to standardize accounting methods and reform the current accounting system in colleges and universities. It is necessary to establish a constraint mechanism for the cost evaluation of higher education, including how to formulate the standard of cost sharing and how to determine the specific proportion of cost sharing (Wu & Duan, 2016; Yuan, 2006). Fourth, starting from the micro research Angle, scholars conducted researches on college and university students and their families, and found that the college and university tuition is really a heavy financial burden for low-income families. Especially when China's current student funding system is not perfect,

college and university fees will lead to the unfair problem of education and even social injustice.

2. Research Methods

This paper intends to use the relevant research methods of public policy assessment to evaluate the effect of the tuition policy of ordinary colleges and universities in China. China's tuition policy has been in effect for nearly 20 years. Therefore, from the perspective of post-evaluation, this paper sets up a comprehensive evaluation index system based on the specific operation process of the tuition policy of ordinary colleges and universities.

The evaluation of policy results cannot be separated from the analysis of the whole policy process, because the results are the result of all the aspects of the policy process working together (Ning, 2003; William, 2002). Therefore, this paper sets up an index system based on the operating process of tuition policy of ordinary colleges and universities. Starting from the theory of public policy evaluation, selections' evaluation criteria usually include the rationality of constructing policy issues, the science of policy making, the high efficiency of policy execution and the effectiveness of policy results (Chen, 2006; Zhang, 2004; Li & Cai, 2006).

From the perspective of empirical research, the methods of policy evaluation mainly include policy experiment method, social index method, and multi-attribute utility analysis. The normative analysis methods mainly analyze the relevant policy problems that are difficult to quantify from the value perspective, which mainly includes focus group method, in-depth interview method, participation observation method, multivariate linear regression model, system dynamics analysis, and non-interventional research method. Scholars have conducted in-depth analysis and research on these policy analysis methods (Liu & Liu, 2008; Chen, Huang, & Tang, 2002; Li, Zhou, & Liu, 2016; Wu & Duan, 2016). Considering the operability and feasibility of the evaluation methods, this paper selected the multi-index comprehensive evaluation method as the basic method to evaluate the tuition policy of Chinese ordinary colleges and universities, used the related methods to measure the index on the basis of constructing the evaluation index system, constructed the comprehensive evaluation model, obtained the comprehensive evaluation value of tuition policy of Chinese ordinary colleges and universities by using fuzzy evaluation method, and finally carried out the comprehensive evaluation method of comparative analysis. The index system established in this paper is shown in **Table 1**.

The above index system consists of qualitative and quantitative indicators, and it can fully reflect the process and result of tuition policy of colleges and universities. At the highest level, the target level is the effectiveness of the tuition policy of ordinary colleges and universities, which are affected by four evaluation criteria. These four evaluation criteria are determined by 16 statistical indicators at the indicator level and indicators are the direct target of evaluation. Different

Table 1. The evaluation index system of tuition policy of Chinese ordinary colleges and universities.

Evaluation objective	Evaluative criteria	Evaluation index	Index evaluation methods
The effectiveness of the tuition policy of Chinese ordinary colleges and universities	The rationality of the construction of tuition policy of ordinary colleges and universities	the urgency of solving the problem of tuition policy of ordinary colleges and universities	Expert questionnaire and interview
		the openness of construction process of tuition policy of ordinary colleges and universities	Expert questionnaire and interview
		the rationality of the objective of tuition policy of ordinary colleges and universities	Questionnaire survey and interview of experts and policy targeted groups
		the sufficiency of the theoretical basis of tuition policy scheme of ordinary colleges and universities	Expert questionnaire and interview
	The scientific of tuition policy making of ordinary colleges and universities	the feasibility of charging standard of tuition policy of ordinary colleges and universities	Expert questionnaire and interview; study and analysis of feasibility of specialized agencies
		the participation of Stakeholder in the setting tuition standards for ordinary colleges and universities	Questionnaire survey and interview of experts and policy targeted groups
		the integrity of the standard setting procedure for ordinary colleges and universities tuition	Expert questionnaire and interview
	the high efficiency of implementation of tuition policy of ordinary colleges and universities interview on	the recognition of tuition policy of ordinary colleges and universities	Questionnaire survey and interview of experts and policy targeted groups
		the ability of relevant administrative departments to ensure the policy implementation	Questionnaire survey and interview of experts and relevant administrative departments
		the ability of ordinary colleges and universities to guarantee the policy implementation	Questionnaire survey and interview of experts and higher education in colleges and universities
		the ability of students and families to afford the tuition of ordinary colleges and universities	questionnaire survey and interview of policy targeted groups; data statistics
		the ability of students and their families to obtain relevant information	Questionnaire survey and interview of experts and policy targeted groups
		the ability of the supervision mechanism of the tuition policy of ordinary colleges and universities	Questionnaire survey and interview of experts and policy supervision organizations

Continued

the effectiveness of the result of tuition policy of ordinary colleges and universities	increase funding for running schools ordinary colleges and universities	Questionnaire survey on experts and policy targeted groups; data statistics
	Improve students' study conditions	Questionnaire survey on experts and policy targeted groups; data statistics
	Promote the equity of starting point of higher education	Questionnaire survey on experts and policy targeted groups; data statistics

indicators adopt different acquisition methods. The qualitative indicator is mainly obtained by investigation and analysis. Based on the questionnaire and interview survey of experts and scholars on the study of tuition policy of ordinary colleges and universities, the targeted group of tuition policy of ordinary colleges and universities, it gets the relevant index data.

There are both qualitative and quantitative indicators in the evaluation index system of tuition policy of ordinary colleges and universities. Evaluation index is the collection of all stages and results of tuition policy of ordinary colleges and universities. Some of these factors are ambiguous, especially for qualitative indicators. Due to the subjective reasons of the respondents, people may not agree with each other on some evaluation indicators of tuition policy of ordinary colleges and universities. Therefore, it is difficult to determine the specific evaluation value of these indicators by statistical methods objectively. Therefore, this paper selected the analytic hierarchy process (ahp) combined with qualitative and quantitative analysis and fuzzy evaluation method as the basic methods to construct the evaluation and measurement model of tuition policy of Chinese ordinary colleges and universities. Among them, ahp focuses on determining the weighting of each indicator in the evaluation index system of tuition policy, while the fuzzy evaluation rule is used to construct the comprehensive evaluation model of the tuition policy utility of colleges and universities.

First, build the initial information and factor set for the evaluation of tuition policy of ordinary colleges and universities as follows:

$$\begin{aligned}
 U &= \{U_1, U_2, U_3, U_4\} \\
 U_1 &= \{U_{11}, U_{12}\} \\
 U_2 &= \{U_{21}, U_{22}, U_{23}, U_{24}, U_{25}\} \\
 U_3 &= \{U_{31}, U_{32}, U_{33}, U_{34}, U_{35}, U_{36}\} \\
 U_4 &= \{U_{41}, U_{42}, U_{43}\}
 \end{aligned}$$

Second, determine the weighting of each indicator of tuition policy evaluation system of colleges and universities. In order to weaken the influence of subjective factors, this paper uses ahp to determine the weighting of each indicator.

Assume evaluation criteria U_k ($k = 1, 2, 3, 4$), there are t indicators associated

with the U_k marked as $U_1, U_2, U_3, \dots, U_t$; Where, the single weighting is marked as $d_1, d_2, d_3, \dots, d_t$. The comparison and judgment matrix of index system and criterion layer is obtained through expert evaluation. Adopt the 1 - 9 scale method proposed by T.L.S, as shown in **Table 2**.

After determining the level of importance of the comparison between the two indicators at this level, the judgment matrix U_k is formed.

U_k	U_1	U_2	...	U_t
U_1	d_{11}	d_{12}	...	d_{1t}
U_2	d_{21}	d_{22}	...	d_{2t}
...
U_t	d_{t1}	d_{t2}	...	d_{tt}

The maximum eigenvalue of the judgment matrix and the normalized eigenvector are calculated as follows:

$$\bar{d}_{ij} = \frac{d_{ij}}{\sum_{k=1}^n d_{kj}} \quad (i, j = 1, \dots, n), \quad \begin{pmatrix} \bar{d}_{11} & \dots & \bar{d}_{1n} \\ \bar{d}_{n1} & \dots & \bar{d}_{nn} \end{pmatrix}$$

$$\bar{W}_i = \sum_{j=1}^n \bar{d}_{ij}$$

The matrix $\bar{W}_i (i = 1, \dots, n)$ is normalized:

$$W_i = \frac{\bar{W}_i}{\sum_{j=1}^n \bar{W}_j} \quad (i = 1, \dots, n)$$

So the vector $W = (W_1, W_2, \dots, W_n)^T$ is the eigenvector. If the consistency test is passed, the eigenvector is the weighting of evaluating each indicator phase of the standard U_k .

The maximum eigenvalue λ_{\max} of the matrix is:

$$\lambda_{\max} = \sum_{j=1}^t \frac{(U_k W)_i}{r W_i}$$

Table 2. The rank algorithm of relatively importance of two indexes.

scale	meaning
1	The former is as important as the latter
3	The former is slightly more important than the latter
5	The former is more important than the latter
7	The former is much more important than the latter
9	The former is absolutely more important than the latter
2, 4, 6, 8	The intermediate value between two adjacent odd Numbers
count backwards	The ratio of the latter to the former is the inverse of the former to the latter

In order to limit the error of subjective rating of experts, take the relative error between λ_{\max} and r as the consistency index of the comparison matrix.

$$CI = \frac{\lambda_{\max} - r}{r - 1} \quad (r \text{ is the order of the judgment matrix})$$

The judgment matrix of order 1 - 9, shown in **Table 3**.

When the judgment matrix is full: $CR = \frac{CI}{RI} < 0.1$, the comparison matrix has satisfactory consistency. Therefore, the calculated eigenvectors can be recognized as weightings. Otherwise, the error of the comparison matrix constructed by experts is large, and needs to be readjustments. By using analytic hierarchy process, we can calculate the weighting of various indexes of tuition policy of Chinese ordinary colleges and universities.

At last, determine the index evaluation set $V = (\text{good, fair, ordinary, poor, bad})$. The corresponding rank score vectors are: $V = (5, 4, 3, 2, 1)$. For qualitative indicators, this article uses the expert investigation method to judge its ranks. Suppose we have N experts score the index, there are t indicators associated with the index U_k . For the indicator U_{kt} there are M_{ktj} experts in total who will tick on the grade V_j , then the the probability of N experts choosing the evaluation value V_h for the indicator U_{kt} can be considered as:

$$r_{krj} = \frac{M_{kth}}{N} \quad (h = 1, 2, 3, 4, 5)$$

Then the evaluation row matrix of single index is:

$$R_{kt} = (r_{kt1} \quad r_{kt2} \quad r_{kt3} \quad r_{kt4} \quad r_{kt5}) = \left(\frac{M_{kt1}}{N} \quad \frac{M_{kt2}}{N} \quad \frac{M_{kt3}}{N} \quad \frac{M_{kt4}}{N} \quad \frac{M_{kt5}}{N} \right)$$

From this, we obtain the evaluation matrix R_k

$$R_k = \begin{bmatrix} R_{k1} \\ R_{k2} \\ R_{k3} \\ \vdots \\ R_{kt} \end{bmatrix} = \begin{bmatrix} r_{k11} & r_{k12} & r_{k13} & r_{k14} & r_{k15} \\ r_{k21} & r_{k22} & r_{k23} & r_{k24} & r_{k25} \\ r_{k31} & r_{k32} & r_{k33} & r_{k34} & r_{k35} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ r_{kt1} & r_{kt2} & r_{kt3} & r_{kt4} & r_{kt5} \end{bmatrix}$$

Apply the mathematical model of fuzzy comprehensive evaluation, and calculate the comprehensive evaluation results of the indicators in this layer based on the weight vector W_k and the evaluation matrix R_k :

$$B_k = W_k \times R_k$$

$$(W_{k1} \quad W_{k2} \quad \dots \quad W_{kt}) \times \begin{bmatrix} r_{k11} & r_{k12} & r_{k13} & r_{k14} & r_{k15} \\ r_{k21} & r_{k22} & r_{k23} & r_{k24} & r_{k25} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ r_{kt1} & r_{kt2} & r_{kt3} & r_{kt4} & r_{kt5} \end{bmatrix} = (b_{k1} \quad b_{k2} \quad b_{k3} \quad b_{k4} \quad b_{k5})$$

Table 3. Random consistency index of different order.

order	1	2	3	4	5	6	7	8	9
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45

fuzzy subset

$B_k = (b_{k1} \ b_{k2} \ b_{k3} \ b_{k4} \ b_{k5})$ ($k=1,2,3,4, b_{kj} \in [0,1]$) is the result of the comprehensive evaluation of the index in k level. The fuzzy comprehensive evaluation of the standard layer is:

$$W \times R = B$$

$$(W_1 \ W_2 \ W_3 \ W_4) \times \begin{bmatrix} b_{11} & b_{12} & b_{13} & b_{14} & b_{15} \\ b_{21} & b_{22} & b_{23} & b_{24} & b_{25} \\ b_{31} & b_{32} & b_{33} & b_{34} & b_{35} \\ b_{41} & b_{42} & b_{43} & b_{44} & b_{45} \end{bmatrix} = (b_1 \ b_2 \ b_3 \ b_4 \ b_5)$$

Here, $B = (b_1 \ b_2 \ b_3 \ b_4 \ b_5)$ is the result of a comprehensive evaluation of the effectiveness of the tuition policy of ordinary colleges and universities in China.

3. Analysis of Empirical Research Results

Based on the established evaluation index system of China's colleges and universities tuition policy, this paper USES the method of questionnaire survey to make an empirical evaluation of China's current tuition policy in colleges and universities. The assessment process is divided into two parts. The first part is a questionnaire survey on college students' closely related indicators, such as the ability of students and their families to afford the tuition, the ability of students and their families to obtain relevant information, the understanding situation and attitude of college and university tuition policy. The second part is a questionnaire survey on experts and scholars associated with higher education, giving the preliminary research data for their reference, so as to obtain the comprehensive evaluation result of the tuition policy of China's ordinary colleges and universities.

In 2008 and 2013, the above methods were used to investigate the major universities in Shaanxi province. Students were investigated by using the method of filling out questionnaires in class, while the research on experts and scholars mainly adopted the form of interview. In October 2008, the author conducted a questionnaire survey in 5 ordinary universities in Shaanxi province, and 500 questionnaires were distributed. In November 2013, the author conducted a survey in 7 universities in Shaanxi province, and a total of 1200 questionnaires were distributed. The recovery rate of both questionnaires was higher than 97%.

First of all, from the survey of university students, the level of direct spending by students increased significantly from the year of 2008 to 2013. It increased from 8914.37 RMB to 10,751.62 RMB. According to the 2013 survey data, there was no significant change in the ways where students receive financial aids. Parents and relatives accounted for 80.62% of the total funding. The university grants increased to 19.57%. At the same time, with the improvement of family income, the direct expenses of students' schooling are also increasing. The questionnaire further asks about the proportion of tuition fees charged by Chinese universities. Of the total questionnaires collected over the two years, 1192 answered the question. Less than a quarter of the students in the survey sample have

a clear understanding of China's current tuition rates, as shown in **Table 4**.

According to the relevant indicators in the evaluation index system of college and university tuition policy, the attitude of students towards China's college and university tuition policy is investigated. In the questionnaire, students are required to judge the relevant evaluation of the tuition policy of Chinese ordinary colleges and universities, as shown in **Table 5**.

As can be seen from the statistics of the above survey, generally speaking, college and university students agree with the implementation of the tuition policy of China's colleges and universities. 68.44% students support higher education charging tuition fees, up to 69.78% in 2013.

When examining the influence of tuition policy on the starting point of higher education, 71.27% students said the tuition policy had some impact on their choice of colleges or universities and majors, and only 19.96% students were completely unaffected. It indicates that tuition fee has become a very important influencing factor for students to choose colleges or universities and majors.

Table 4. The main expenditure structure of students and its total amount in school.

Items of expenditure	Effective samples	Mean value (RMB/year)	Proportion (%)
tuition fee	489	4137.93	46.42%
boarding fee	489	1018.40	11.42%
textbook fee	485	365.98	4.11%
Food costs	476	1968.32	22.08%
Transportation expenses (daily transportation expenses, travel expenses to and from home)	480	289.56	3.25%
cost of daily necessities (clothes, cosmetics, tobacco, wine, tea, etc.)	473	406.45	4.56%
cost of school supplies (including personal computer, electronic dictionary, walkman, etc.)	352	178.06	2.00%
Admission fee	178	88.75	1.00%
Casual books, newspapers, player fees	478	65.09	0.73%
Mobile phone and fixed telephone charges	482	169.67	1.9%
expenses of surfing internet	386	79.48	0.89%
Travel, entertainment and communication expenses	357	146.68	1.65%
Total		8914.37	100%

Data source: Sorting data according to the survey data of 2008 college tuition policy questionnaire.

Table 5. Statistics on the attitude of students towards the tuition policy of China's ordinary colleges and universities in 2008.

	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Support the policy of colleges and universities charging students and their families tuition fees	25.67%	42.77%	10.68%	12.33%	8.55%
The implementation of the tuition policy of ordinary colleges and universities can provide more education opportunities and financial support to improve conditions of running schools, and can effectively solve the problem of China's colleges and universities insufficient funds.	35.78%	32.11%	9.03%	14.77%	8.31%
The charging standard of ordinary colleges and universities has no influence on my choice of colleges and majors	7.64%	12.32%	8.77%	43.22%	28.05%
To get a better job, it's worth paying for college or university now	29.18%	59.07%	6.08%	3.66%	2.01%
For the higher education service currently offered by college or university, the tuition paid is worth it	9.77%	15.89%	11.33%	32.44%	30.57%
College or university students and their families have a strong ability to obtain relevant information of tuition policy	10.46%	16.37%	23.69%	40.98%	8.50%
The process of setting the standard of tuition fees charged by colleges and universities in each academic year is very democratic	4.73%	10.85%	23.88%	41.25%	19.29%

General college tuition policy questionnaire, Shaanxi education development statistics bulletin, Shaanxi statistical yearbook.

From the perspective of the employment motivation of students to pay the tuition fee, even under the difficult employment situation, still 88.25% college and university students believe that paying for college or university now will provide them with better job opportunities in the future.

However, from the perspective of higher education service provided by colleges and universities for students, only 25.66% students in college or university think the tuition they are paying is worth it. 63.01% students think the university's educational service is not worth the tuition they pay. Nearly 70.33% students still support China's colleges and universities charging students and their families in the results of study in 2013, even in the situation where tuition fee was increased.

However, the evaluation rating on higher education services obtained by paying tuition is still low.

65 experts and scholars (Among which, there are 29 college teachers, 15 ad-

ministrators, and 21 administrators in the department of education of Shaanxi province) related to higher education were investigated, and the research content includes two parts. First of all, using ahp, the research objects gave the importance of comparing two indexes of the four criteria levels, and determined index weighting. Second, the survey objects graded each qualitative index. In order to ensure that there is a certain basis for the judgment of qualitative indicators, when conducting the expert survey, the previous research results of the students are given to them for reference.

In 2008 and 2013, the survey results from the index weight were basically consistent. The research results of 2018 are listed in **Table 6**. The most important

Table 6. The weight of each index in the evaluation index system of tuition policy of Chinese ordinary colleges and universities.

Evaluation objective	Evaluative criteria	Assessment index	Weight	
The effectiveness of the tuition policy of Chinese ordinary colleges and universities	The rationality of the construction of tuition policy of ordinary colleges and universities W1 = 0.126	The urgency to solve the problem of tuition policy of ordinary colleges and universities	W11 = 0.566	
		The openness of the construction process of tuition policy of ordinary colleges and universities	W12 = 0.434	
		The rationality of the objective of the tuition policy of ordinary colleges and universities	W21 = 0.174	
	The science of the construction of tuition policy of ordinary colleges and universities W2 = 0.213		The sufficiency of the theoretical basis of the tuition policy scheme of ordinary colleges and universities	W22 = 0.166
			The feasibility of the charging standard of tuition policy of ordinary colleges and universities	W23 = 0.201
			Stakeholders' participation in setting tuition standards for ordinary colleges and universities	W24 = 0.322
			The integrity of the standard setting procedure for the tuition of ordinary colleges and universities	W25 = 0.137
			The recognition of tuition policy of ordinary colleges and universities	W31 = 0.101
	The efficiency of the implementation of the tuition policy of ordinary colleges and universities W3 = 0.362		The ability of relevant administrative departments to ensure the policy implementation	W32 = 0.168
			The ability of ordinary colleges and universities to ensure the policy implementation	W33 = 0.097
			The ability of students and their families to afford the tuition of ordinary colleges and universities	W34 = 0.221
			The ability of students and their families to obtain relevant policy information	W35 = 0.264
			The ability of the supervision mechanism of the tuition policy of ordinary colleges and universities	W36 = 0.149
The effectiveness of the result of the tuition policy of ordinary colleges and universities W4 = 0.299		increase funding for running schools in ordinary colleges and universities	W41 = 0.277	
		Improve students' educational conditions	W42 = 0.316	
		Promote starting point equity of common higher education	W43 = 0.407	

Data source: Get the basic data from *Questionnaire on the evaluation of tuition policy of Chinese ordinary colleges and universities* and calculate the data in above table.

weight in the evaluation standard layer is the high efficiency of the implementation of tuition policy of China's colleges and universities. The important weight in the index level is the ability of students and their families to obtain relevant information and the ability of students and their families to afford the tuition level of ordinary colleges and universities. The second important weight is the effectiveness of the result of the tuition policy of Chinese ordinary colleges and universities. The higher weight in the evaluation criteria layer is to promote the starting point equity of higher education, secondly to improve students' learning conditions, and finally to increase the funding of ordinary colleges and universities. The third important weight is the science of the tuition policy making of ordinary colleges and universities. The higher weight in the evaluation standard layer is the participation of stakeholders in setting college and university tuition standards and the feasibility of charging standard of college tuition policy. It can be seen that the democracy is the most important in the process of formulating the tuition policy of Chinese ordinary colleges and universities as respondents believed.

Through the survey in the second part of the questionnaire, the evaluation results of qualitative indicators are obtained. The fuzzy evaluation matrix of the four standard layers is as follows:

$$R_1 = \begin{bmatrix} R_{11} \\ R_{12} \end{bmatrix} = \begin{bmatrix} 0.1 & 0.6 & 0.3 & 0 & 0 \\ 0 & 0.2 & 0.5 & 0.2 & 0.1 \end{bmatrix}$$

$$R_2 = \begin{bmatrix} R_{21} \\ R_{22} \\ R_{23} \\ R_{24} \\ R_{25} \end{bmatrix} = \begin{bmatrix} 0 & 0.1 & 0.3 & 0.5 & 0.1 \\ 0.4 & 0.5 & 0.1 & 0 & 0 \\ 0.1 & 0.3 & 0.5 & 0.1 & 0 \\ 0 & 0.2 & 0.5 & 0.3 & 0 \\ 0.2 & 0.5 & 0.3 & 0 & 0 \end{bmatrix}$$

$$R_3 = \begin{bmatrix} R_{31} \\ R_{32} \\ R_{33} \\ R_{34} \\ R_{35} \\ R_{36} \end{bmatrix} = \begin{bmatrix} 0 & 0.2 & 0.4 & 0.4 & 0 \\ 0 & 0.1 & 0.6 & 0.3 & 0 \\ 0.1 & 0.4 & 0.4 & 0.1 & 0 \\ 0 & 0.4 & 0.3 & 0.2 & 0.1 \\ 0 & 0 & 0.4 & 0.5 & 0.1 \\ 0.1 & 0.1 & 0.4 & 0.4 & 0 \end{bmatrix}$$

$$R_4 = \begin{bmatrix} R_{41} \\ R_{42} \\ R_{43} \end{bmatrix} = \begin{bmatrix} 0.2 & 0.5 & 0.3 & 0 & 0 \\ 0.2 & 0.4 & 0.4 & 0 & 0 \\ 0 & 0.2 & 0.4 & 0.3 & 0.1 \end{bmatrix}$$

The weight and fuzzy evaluation matrix of each index in the four standard layers are introduced into Equation 4.1 to calculate the comprehensive evaluation results of each standard layer.

$$B_1 = [0.0566 \quad 0.4264 \quad 0.3868 \quad 0.0868 \quad 0.0434]$$

$$B_2 = [0.1139 \quad 0.2936 \quad 0.3714 \quad 0.2037 \quad 0.0174]$$

$$B_3 = [0.0246 \quad 0.1791 \quad 0.4115 \quad 0.3363 \quad 0.0485]$$

$$B_4 = [0.1186 \quad 0.3463 \quad 0.3723 \quad 0.1221 \quad 0.0407]$$

The fuzzy comprehensive evaluation matrix of the four standard layers was introduced into Equation (4.2) to calculate the result of comprehensive evaluation of the effectiveness of the tuition policy of China's ordinary colleges and universities.

$$\begin{aligned}
 B = W \times R &= (0.126 \quad 0.213 \quad 0.362 \quad 0.299) \\
 &\times \begin{bmatrix} 0.0566 & 0.4264 & 0.3868 & 0.0868 & 0.0434 \\ 0.1139 & 0.2936 & 0.3714 & 0.2037 & 0.0174 \\ 0.0246 & 0.1791 & 0.4115 & 0.3363 & 0.0485 \\ 0.1186 & 0.3463 & 0.3723 & 0.1221 & 0.0407 \end{bmatrix} \\
 &= (0.0758 \quad 0.2846 \quad 0.3881 \quad 0.2126 \quad 0.0389)
 \end{aligned}$$

Further calculated the comprehensive value Z , and obtain the comprehensive evaluation value of the effectiveness of college tuition policy.

$$Z = 71.46$$

In 2008, the comprehensive evaluation value of the respondents on the effectiveness of the current tuition policy of ordinary colleges and universities in China was 71.46. In 2013, the above methods were used again for research, and the results showed that the university policy implementation with the largest weight in the indicator system had the lowest comprehensive score of high efficiency. Students and their families also scored low on their ability to obtain relevant policy information. The index scored 60.5 in 2013, lower than that of 63 in 2008. The 2013 comprehensive tuition policy score was 70.68, decreased slightly from that in 2008.

4. Conclusion

According to the survey results of students and experts and scholars related to education, the problems of China's college and university tuition policy are mainly reflected in the following aspects: 1) Students and their families have low ability to obtain information related to the tuition policies of ordinary colleges and universities, which leads to the information asymmetry between the subjects of the tuition policy of colleges and universities. According to the survey of the students in college or university, the students do not know much about the tuition policy of China's ordinary colleges and universities. Less than 20 percent of respondents said they had studied the tuition policies of ordinary colleges and universities carefully and could correctly answer the specific content of the policies. Nearly 80 percent of college students don't know much about China's tuition policy. 2) The research results show that the increasing tuition fees of colleges and universities have exerted a great influence on whether students can accept the higher education opportunity fairly, and the score of whether it can promote higher education starting point equity is also low. 3) The objective of the tuition policy of ordinary colleges and universities is not reasonable. To solve the problem of insufficient funds investment in the popularization of higher education was set as the tuition policy target, which is a clear violation of the

long-term positioning and role of China's higher education in comprehensive, coordinated and sustainable economic and social development. 4) The participation of stakeholders in the formulation of tuition standards of ordinary colleges and universities is relatively low. According to the science standards of the tuition policy of China's ordinary colleges and universities, the stakeholders' participation index of the tuition standard of ordinary colleges and universities had the lowest score. In the process of setting the tuition standard of Chinese ordinary colleges and universities, the interests of the central government, local administrative departments and universities can be reflected, but it's difficult for students and their families, who are subjects to tuition fees, to get involved. So the reasonable interest balance mechanism has not been established.

In view of the above problems, this paper mainly proposes the following two points: 1) Establish a fair-oriented tuition policy for ordinary colleges and universities. The implementation of the general college tuition policy has provided financial support for China's higher education to move towards popularization, which promotes the efficient use and efficient allocation of higher education resources. At present, China's higher education has entered the popular development stage, and higher levels of equity should be achieved through efficiency improvements. Therefore, the future development and adjustment of the tuition policy of ordinary colleges and universities in China should be oriented by promoting the fairness of education to realize the harmonious development of higher education. From the perspective of the tuition standard of ordinary colleges and universities, in addition to the cost of each students' education, the income level of residents should also be considered. From the point of the charging ways of tuition fees, according to the time relation between cost compensation and teaching activities, the payment forms of tuition fee can be divided into real-time payment system, prepaid tuition system and delayed payment system. Deferred payment system means that students pay current tuition fees in the form of future income or services, and the main forms are student loans, graduate taxes, service contracts, etc. (Schultz, 2008). 2) The college tuition policy should take the people's interests into full consideration in terms of problems, formulation, implementation and evaluation. Shaanxi province issued *education charge decision hearing system implementation measures* in 2005 which stipulates that representatives of students and parents are generally not less than one third of the total number of hearing representatives (*Measures for the implementation of Shaanxi education fee decision-making hearing system*). Therefore, we need to calculate the cost of education before pricing or price adjustment of education to avoid the blurring and lack of persuasion of education cost information (Yu, 2002).

In the process of setting the tuition standards of ordinary colleges and universities, an effective hearing system should be established in order to provide a direct way to express the demands of the subjects related to the interest of tuition policy except the government and universities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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