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Reflection on the pricing of college tuition

Zhao Feng¹, Su LongZhong², Zhang Fan¹

¹University of International Business and Economics, School of Public Administration, Beijing 100029, (CHINA)

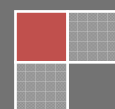
²University of International Business and Economics, Education Foundation, Beijing 100029, (CHINA)

ABSTRACT

Tuition pricing system of higher education is the keypoint of continuous reform and improvement of higher education charging system in China since the implementation of it. It also has been a great concern of social policy focus and difficulty. This paper establishes pricing econometric model for higher education tuition and put forwards strategies and suggestions on optimizing tuition pricing in principle of efficiency and fairness and based on fully explaining the meaning and essence of higher education fees and cost sharing and analyzing the relationship between higher education costs and tuition pricing.

KEYWORDS

Higher education; Tuition pricing; Utility function.



THE PROCESS OF HIGER EDUCATION CHARGING SYSTEM IN CHINA

Since the founding of People Republic of China, the higher education charging system has three stages mainly under the guidance of the government, they are free tuition, parts of charges (*dual track*) and full charges (*merge tracks*) in the end. Reform of higher education charging system thanks for the people's growing desire for higher education to enhance their ability and national objective need for service personnel to obtain higher economic construction and social development.

In the early days of new China, all things are under construction. National economic construction needs a large number of highly educated professionals urgently. Also due to the entire national economy is dominated by copying the Soviet planned economy which leads to plan of assignment of highly educated professionals becomes the best choice. So lack of choice freedom of personnel and the reality of low payment status can only be compensated by free tuition. Under the free tuition system, universities need to rely on government funding as the main or even the only source of funding sources. This *bilateral* cooperation between universities and government have played a significant role in promoting development of higher education and China's economic construction and social development under the prevailing environment and it is the correct decision in line with the prevailing circumstances and development needs.

At the beginning of reform, as China's economy has gradually been changed from a planned economy to a market economy with Chinese characteristics, the market demand for talent gradually expanded, the people's demand for higher education are also growing, which forms clear contrast between national funding of education can supply a small part of the *elite* education. Encouraged by the market-driven policies and takes commissioned training students and students at their own expense as represent, colleges and universities try to start educational charging system partly. These attempts become beneficial and necessary supplement for making up the lack of funding of higher education and meeting the people's strong demand for higher education at that time.

With the further development of market economy, China has gradually strengthened the changes of higher education from *elite* to *popular*. Thence, the national education funding has been allocated can not afford the growing cost of education due to the number of college students expanding rapidly from market competition caused. Faced with a series of higher education while equity issues arising from the pilot phase, the two-track system, "some of the charges," and gradually merged to comprehensive education fee system become a trend.

Change over three stages to become the only way for our country and the first decade of the 21st century, after decades of the 20th century development of higher education. In the long run, China's system of higher education fees will continue to adapt to economic and social development and macroeconomic conditions and constantly improved.

TUITION COST SHARING MECHANISM OF HIGHER EDUCATION

Cost-sharing of higher education should take characteristics of quasi-public goods of higher education as its theoretical basis. Modern economic theory takes consumer competitive, exclusive and welfare of products and services as the division standards and divided them into three categories-private goods, public goods and quasi-public goods. Private goods should be fully provided by the market, public goods should be fully provided by the government, while quasi-public goods should be provided by the market and the government in share. Put higher education into definition of quasi-public goods, mainly due to it meet the competition, exclusive and welfare characteristics of quasi-public goods: its competitive performance is that given the scale in higher education, a person access to higher education means that another person lost this opportunity. Its exclusive performance is that a person receive higher education and can exclude others to receive may be acceptable technically. In addition to competitive and exclusive, higher education also has positive externalities, such as public welfare. Higher education can improve the quality of human capital value and population, thereby promoting economic growth, while the entire community of people get promoted morality, reducing crime rates and social costs to improve social welfare, is the important impetus of national material and spiritual civilization. Thus, higher education as a *special* quasi-public goods, has properties of both private goods and public goods, make individual income and social benefits exist at the same time. The quasi-public goods properties of higher education determines the cost-sharing model that benefit parties of higher education should share the cost.

Former president of New York State University, educators and financial experts, Professor John Stone (D. Bruce Johnstone), published a book in 1986, *Higher Education Cost Sharing: UK, Germany, France, Sweden and the United States Student financial aid policy*. Professor Johnstone in the works proposed higher education cost-sharing theory, the theory that the higher education tuition costs should not be borne the government budget entirely, but should be shared by the main parties. They include government, parents and students, colleges, community donors and so on. To implement tuition cost-sharing mechanism in higher education, that is, the total amount of financial investment in the government's public education under certain circumstances, students learning miscellaneous expenses and living expenses borne in part by the parent or student, college appropriate increase in tuition fees, thus higher moderate increase in the total amount of funding for higher education gross enrollment rate is improved, more people enjoy the opportunity to receive higher education. This has obvious positive role in promoting the sound development of higher education and educational opportunities. Higher cost sharing mechanism, a clear commitment to the principle of who benefits and who, on the guarantee fund investment in higher education is important. For an individual, pay for higher education based on their personal income is expected to increase; For the government, to provide higher education funding is based on its future can promote the development of society; therefore, is based on the quasi-public goods characteristics of higher education, Higher tuition cost sharing mechanism has

gradually become common practice in higher education investment is used around the world. China "Higher Law" clause stipulates that "university education should be based on cost, taking into account the capacity of the family, the appropriate charge a certain percentage of tuition." This is the correct provisions of the Higher Education Cost Sharing, is the principle of balance between efficiency and equity concrete manifestation.

RELATIONSHIP BETWEEN COST AND PRICING OF TUITION OF HIGHER EDUCATION

Whether compliance with the history of higher education fees, or based on economics or quasi-public goods characteristics of higher education, higher education costs should be borne by the private section. So the cost of higher education as a private higher education tuition pricing assumed, naturally should be set at the cost of higher education and private student culture sharing ratio of the product. However, the latter two barriers are effective accounting education tuition increases the difficulty of pricing.

Higher student training costing major problems

First, the barriers existing financial accounting system itself universities. Currently public universities in most countries is not established cost accounting system of education, Chinese universities as public institutions, non-profit organization, implementing a cash basis rather than accrual, cash basis accounting records only current funding for education expenditures, expenditures are not apportioned according to the benefit period, accounting cannot be achieved with current earnings ratios to match the current cost data. Different accounting systems can not follow it to implement accrual companies and other for-profit institutions, and accurate measurement of overall annual expenditure universities. Secondly, the actual expenditure universities undertake teaching, scientific research and social service functions. Scientific research and social service expenditures are included in the cost of higher education, or what percentage of the cost of higher education is still questionable inclusion, research and social services to higher education contribution rate is still only rely on the experience of experts and scholars in general estimates. Internationally accepted practice is still not the research into education and social services costs, the cost of higher education is only limited in its function occurred pay range. Finally, in reality, universities diversified disciplines often complicated set of characteristics exist between different professional interpenetration phenomenon in the curriculum teaching and skills development, common costs between disciplines difficult to accurately clarify. How professional metering cost of higher education respectively, converted into different professional training cost per student is still a big problem.

The main problem of higher education private sharing ratio measurement

Professor John Stone (D.Bruce Johnstone) pointed out that if tuition is too high, there will be too many students need financial assistance to offset the marginal net effect of tuition fees; If tuition is too low, then the regular tuition revenue is insufficient to cover tuition fees, adjust tuition and cost required to resolve the political and management issues for students delay in payment, namely how to calculate the proportion of higher cost-sharing and determine the existence of difficulties. Public colleges and universities in foreign countries, personal commitment by students and parents basic tuition ratio range of about 20% -25%. China's current "Interim Measures Higher fees" were born in the proportion of the cost of education and training of college tuition accounts for a maximum of 25%, but did not make the proportion of individuals need to take more clearly defined. According to mainstream economic theory, should be accounted for separately priced private and social benefits of higher education to determine the cost of private education in proportion to the revenue-sharing ratio. However, growth in domestic income inequality, low-income families to bear the growing issue of tuition fees is very prominent. How to determine the proportion of the cost of education has become a private share serious problem according to residents of affordability.

ANALYSIS OF ECONOMETRIC MODEL

Based on the above analysis, the tuition price should consider not only the private and social costs and benefits, but also the income levels and affordability, it should be priced by econometric analysis in principle of efficiency and fairness.

Get inspiration from Timothy Besley and Stephen Coate (1991, AER) model on public provide of the private goods, this paper established the following models.

Consider affordability of residents, suppose there are two students come from different family background, one comes from low-income family L and the other come from higher-income family H . The former family income is Y_L , proportion of the population is γ_L ; The latter family income is Y_H , $Y_L < Y_H$, proportion of the population is $\gamma_H = 1 - \gamma_L$. Because family income is private information, the school can not fully know, so there is asymmetric information. Reasonable mechanism must be designed so as to effectively reveal the student types in order that school can implement tuition pricing policies better. Because schools cannot understand the student's prior level of family income, they can only provide a uniform amount q_0 of higher education for every student, and take uniform tuition fee: T_0 per person. Suppose per unit cost of education is $c = F + v$, F is a fixed cost, which includes universities hardware facilities, fixed assets, etc., v is variable costs, which includes teachers' salaries, research fees, canteen subsidies, utility costs, etc.. Each student enjoy q_0

unit education and the total social cost is cq_0 , the sharing ratio for students is t_0 . So each student paid tuition is $T_0 = t_0cq_0$.

To ensure the fairness of the distribution of educational resources, university should ensure that low-income students can afford the basic tuition T_0 and enjoy the basic higher education q_0 , to obtain personal benefits or utility $U(q_0, Y_L - T_0)$, and bring benefits for the community $W(q_0)$. The utility of low-income students do not accept higher education is $U(0, Y_L)$. Therefore, the principle of fairness means that satisfy the constraints of participation $U(q_0, Y_L - T_0) \geq U(0, Y_L)$. In this case the financial contribution for each low-income student costs is $G_L = (1 - t_0)cq_0$. In order to promote the efficiency of education, universities can provide additional part of its higher education q_1 according to the actual needs of students in high-income families and design different cost sharing ratio t_1 of this part of the educational in order that they can take extra tuition $T_1 = t_1cq_1$. High-income families pay the tuition $T_0 + T_1$ to enjoy higher education $q_0 + q_1$ and produce gains or utility $U(q_0 + q_1, Y_H - T_0 - T_1)$, and bring benefit $W(q_0 + q_1)$ for society. If high-income families only enjoy basic higher education q_0 , and its benefit is $U(q_0, Y_H - T_0)$, if not enjoy higher education, its benefit is $U(0, Y_H)$. The principle of benefit means that satisfy the incentive compatibility $U(q_0 + q_1, Y_H - T_0 - T_1) \geq U(q_0, Y_H - T_0)$, and satisfy the constraints of participation $U(q_0 + q_1, Y_H - T_0 - T_1) \geq U(0, Y_H)$. Meanwhile, low-income families students will not enjoy this part of the additional education, that is $U(q_0, Y_L - T_0) \geq U(q_0 + q_1, Y_L - T_0 - T_1)$. At this time, Finance share cost $G_H = (1 - t_0)cq_0 + (1 - t_1)cq_1$ for each student in high-income families. Assuming a total budget constraint of capita amount of financial subsidies for higher education is B , premise achieve of these two objectives is to meet budget constraints $\gamma_L G_L + \gamma_H G_H \leq B$. Therefore, in this context, provides a suitable amount of basic education q_0 , corresponding proportion of cost sharing t_0 , additional quantity of education q_1 , corresponding share ratio of cost t_1 , in order that through students' self-selection, accurately reveal the student's family income, eliminate information asymmetry, achieving equity and efficiency and maximize private and social benefit W of all student. Which is the essential mechanism of tuition pricing. The above analysis can be summarized as the following optimization mathematical problem:

$$\max_{\{q_0, t_0, q_1, t_1\}} W = \gamma_L [U(q_0, Y_L - T_0) + W(q_0)] + \gamma_H [U(q_0 + q_1, Y_H - T_0 - T_1) + W(q_0 + q_1)]$$

$$\text{s. t. } U(q_0, Y_L - T_0) \geq U(0, Y_L)$$

$$U(q_0, Y_L - T_0) \geq U(q_0 + q_1, Y_L - T_0 - T_1)$$

$$U(q_0 + q_1, Y_H - T_0 - T_1) \geq U(q_0, Y_H - T_0)$$

$$U(q_0 + q_1, Y_H - T_0 - T_1) \geq U(0, Y_H)$$

$$\gamma_L G_L + \gamma_H G_H \leq B$$

By get the optimization answer of the above-mentioned solution, we can the best tuition prices to meet the principles of fairness and efficiency, and maximize the private and social benefits.

Universities should estimate function and coefficient of the part of upper formula and adjust tuition pricing in real time based on the past experience.

SUGGESTIONS

In order to use above econometric model more effectively to carry out tuition pricing. This paper put forwards the following suggestions:

1. For college student cannot be accurately measured at cost, the cost measurement standards of college should be further improved in higher education: (1) by adjusting expenditures and depreciation simulation methods, under certain accuracy of accounting measurement regime change through conversion and adjustment accounts. (2) The proportion of the cost of higher education included strict regulations, precisely defined statistical measurement range or by laws, regulations or policy documents. (3) the introduction of "full-time student equivalent" to determine the number of students, student academic level differences given different weights standards. China should fully consider the basis for the implementation and effectiveness of the new developments in education in recent years, a similar approach based on the continuous improvement of university accounting system, further revised and improved cost measurement standards of higher education.

2. For the efficiency of real-time adjustment of universities pricing, colleges and universities should establish other disadvantaged groups in higher education compensation system at the same time. Through continuous improvement of scholarships, student loans and tuition fee waiver system to try to create conditions for other vulnerable groups to take equal

opportunities in higher education, thereby combining the mechanism of econometric model, from multiple perspectives to take the income level of residents into account of tuition pricing system. Thus, when the econometric model for improvement so that it cannot be real-time calculation results with the best tuition price deviations, we can also be resilient and effective guarantee needy students to complete their studies.

3. for rent seeking problem exists in independent pricing of universities, the government should implement Colleges information disclosure systems. Information published a comparative features and enormous social pressure of public opinion will encourage universities to eliminate the cost of false behavior, and take efforts to reduce operating costs, and improve management efficiency, thereby reducing the cost burden on society and the private fundamentally. Information published also enable universities to self-examine, recognize their own deficiencies on cost management by comparing, thereby to make clear direction for future improvements.

In short, college tuition fees based on the cost of education is a relatively enjoy the most reasonable choice of policy options and institutional arrangements, it's problem is that the national higher education (social) benefits and personal (private) benefits are difficult to accurately measure, and thus the exact proportion of the cost of education share is difficult to measure. However, with the improvement of colleges and universities accounting system in china, education cost accounting technology continues to improve and strong support of computer information technology, it is soon for higher education cost-sharing ratios and charging system in universities are developing gradually tend to be reasonably accurate.

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