

Risk Perception of Individuals in Human Capital Investment Decision-making from the Perspective of Incomplete Information

Wenxiao Liu

School of Education Science, Jiangsu Normal University, Xuzhou, China

Abstract:

In the environment of incomplete information, risks and uncertainties have an important impact on human capital investment decisions by individuals. In the research, the investigation of individuals' perception of risks in the process of human capital investment decision-making shows that individuals' attitude towards academic completion risks is cautious but still not optimistic, and the level of employment risks and income acquisition risks is underestimated. The first reason is that individuals do not know the actual situation after entering school because of incomplete information, and the second reason is that the investment income of human capital is wrongly estimated due to confusion of two production processes, difficult change of traditional ideas and the influence of survivors' deviation. In order to improve individual risk perception level, measures such as confirming public demand, enriching information disclosure content, building government-led or regulated information intermediary, establishing long-term effective information transmission mechanism, carrying out individual development guidance, and regulating media information dissemination should be actively taken to minimize the occurrence of decision-making risk.

Keywords: Investment in human capital, Incomplete information, Risk perception, Risk of decision making.

I. INTRODUCTION

According to the theory of human capital, "education investment is an important way to invest in human capital", so an individual's choice of higher education can be regarded as an individual's investment decision in the higher education market. However, in the environment of incomplete information, risks and uncertainties have an important impact on individual education investment decisions.

Based on the hypothesis of economic man, the theory of human capital holds that educational cost and benefit are the main factors that affect individual choice in higher education. Nevertheless, under the condition of incomplete information, the information such as educational cost and educational benefit that individuals and their families refer to when making the choice of whether to receive higher education are almost not completely objective and accurate, but must be the "perceptual information" formed based on their cognitive level, resulting in that individuals must face great risks in educational decision-making. The

so-called risk understood by people in real life is the unfavorable result or loss caused by uncertain factors, then the decision-making risk can be understood as the possibility of loss due to the actual income deviation from the expected due to uncertainty factors.

Under the background of the popularization of higher education in China, it is undoubtedly of great practical significance to explore individuals' cognition of risks in the process of higher education selection when more and more public and private resources are invested in the field of higher education [1].

II. LITERATURE REVIEW

In 1961, Theodore W.Schultz first pointed out in his article *The Achievements of Higher Education* that human capital investment, like physical capital investment, also has risks. "It is really difficult to determine these benefits of education investment ... every investment in the field of higher education is ahead of time, long-term and committed to the future, no matter what form it takes, so it is plagued by certain risks and uncertainties". Gary S. Becker also believed that it is wrong to regard education investment as a safe investment without risk, and pointed out that "investment in higher education is subject to considerable risks" [2].

Schultz pointed out in his book *The Economic Value of Education* in 1964 that the risk of individual human investment comes from the uncertainty of one's own talents, employment and capital market. Becker also distinguished three sources of uncertainty in the return on investment in education in his book *Human Capital* that the actual return on human capital revolves around the expected return, which is due to the uncertainty of some factors. The length of life is always rather uncertain, which is an important factor in determining earnings, and people are not sure of their abilities. In addition, the income of a person with fixed age and ability is uncertain, because there are many unpredictable things" [3].

Some western scholars have discussed the possible reasons that lead to the risk of human capital investment from different aspects: Individuals can neither fully determine their own abilities and nor fully understand the quality of education (D. Levhari & Y.Weiss, 1974; Joseph Williams, 1978; David Corder, 1986); Investment in education needs a long process, and the wage rate in the future job market cannot be accurately predicted (D. Levhari & Y.Weiss, 1974; Joseph Williams, 1978; David Corder, 1986); the relationship between labor supply and demand in the future labor market (D. Levhari & Y.Weiss, 1974; David Corder, 1986); the knowledge and technology now accepted will soon be replaced by new knowledge and skills in the future (Joseph Williams, 1978; Mousumibhatta-Charga & Patrick Wright, 2000) et al. [4].

Domestic scholars such as Ma Ning and Chen Liwen believed that higher education has a high cost and a long period of investment, and the return on investment depends not only on the quality of education services provided by colleges, but also on the quality of the educated themselves. The return on investment in higher education is also affected by the imperfect labor market, the fluctuation of economic cycle and the relationship between labor supply and demand. Due to the ongoing reform and development of China's

higher education and the changing national policies and economic situation, it is difficult for individuals to make accurate and effective judgments about the future with the information they have obtained. In addition, at present, individuals are unable to make accurate and effective evaluation and future expectations of investment projects due to their limited expected ability when making investment decisions, resulting in the existence of investment risks in higher education [5].

Lai Desheng believed that individuals are faced with many choices when choosing higher education, including the choice of institutions, majors and years of education. The same individual will have different benefits if he makes different choices, which implies obvious opportunity cost and choice risk. For example, in terms of major selection, the internal major setting in colleges and colleges in China at the present stage is very complicated, because the major reflects the social division of labor and the talent market demand, which determines the market demand for different majors in the future is not the same. From the perspective of economic returns, people are of course willing to choose the so-called "hot" major [6], but one cannot avoid deviation in the choice of major due to the lagging effectiveness of higher education and insufficient market information.

Peng Juxiang and Su Yuhong focused on the individual's education process and held that the individual's education process is also the process of receiving education services. College teachers are producers of educational services and are highly subjective. Their knowledge level, research ability and working attitude will cause the quality of educational services production process and service products to be difficult to meet the users' expectations for quality, which constitutes a process risk [7]. Secondly, the cognitive level, learning attitude, emotional value and other factors of the educated will affect the learning effect, which will also induce process risks.

Risk factors run through the whole process of investment in education, including the choice of access to education, access to education services and the return after the investment. It is not the purpose of this study to systematically explore the risk factors of individuals in the whole process of higher education investment. Considering the availability of data, in this paper, we mainly discuss the individual's cognition of risk and its causes in the process of higher education selection, and limit the "individual" to the high school students who will face the higher education selection.

III. RESEARCH DESIGN AND ANALYSIS METHODS

The large sample questionnaire was mainly used to examine individual cognition of risk. The individual's existing cognitive level was obtained through the individual's approval of several statements.

There are three types of risks mentioned in the existing literature on the risk of educational investment: (1) the academic completion risk (the risk of high school graduates successfully completing their college studies); (2) employment risk; and (3) risks from unstable income. In addition, there may still be the fourth kind of education investment risk under the social background of China, namely, the risk that students will not be admitted after application for the college [8]. In this study, the focus is on examining individuals'

cognitive levels of the first three types of risks, namely, academic completion risk, employment risk and income acquisition risk (the risk caused by instable income).

The data used in this study comes from a large database. After visiting seven provinces, municipalities and autonomous regions from October to December, 2015, researchers distributed 3,706 questionnaires in 34 middle schools in 22 cities, counties and towns including SY City, JMS City, HN County, HC County, DL City, YT City, LY City, QD City, ZB City, SH City, HJ County, GY City, QZ City, BJ City, LPS City, XY City, NN City, QZ City, WL Town, NL Town, LS County and PB County, and 3,681 questionnaires were collected, with a recovery rate of 99.3%, of which 3,605 were valid questionnaires with an effective rate of 97.9%. A total of 151 people were interviewed individually or collectively, including 79 students, 73 teachers and 13 principals.

In order to ensure that the students of grade three who participated in the questionnaire survey are representative, the sample selection covers the so-called "key middle schools" (called provincial/municipal/district-level model high schools, provincial standardized schools, provincial class I/II/III model high schools, etc.) and "non-key middle schools" (ordinary high schools) according to different division standards of different places when considering the differences of their classes in the selection of sample high schools. Taking into account the geographical distribution, 31 provinces, municipalities and autonomous regions were divided into the east (Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan), the middle (Shanxi, Anhui, Jiangxi, Henan, Hubei and Hunan), The West (Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang) and the north-east (Liaoning, Jilin and Heilongjiang) regions according to the division method of the National Bureau of Statistics on June 13, 2011, and a total of 34 high schools were selected as a sample of high schools based on the principle of convenience.

Description of samples is shown in Fig 1-3.

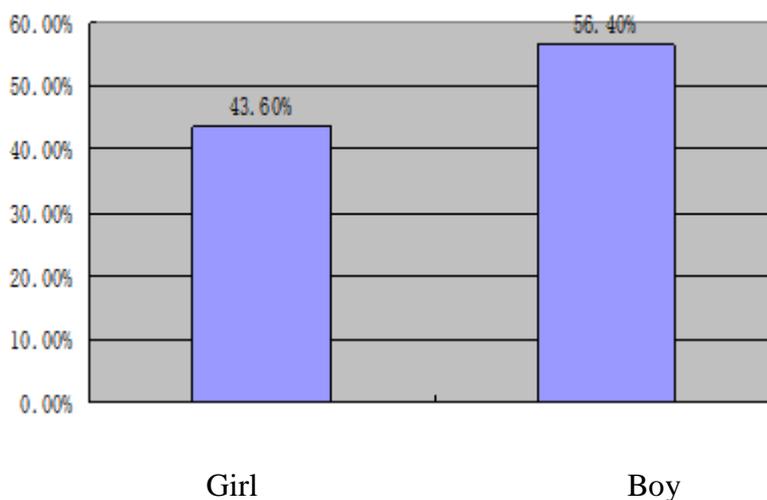


Fig. 1: Gender proportion of students surveyed

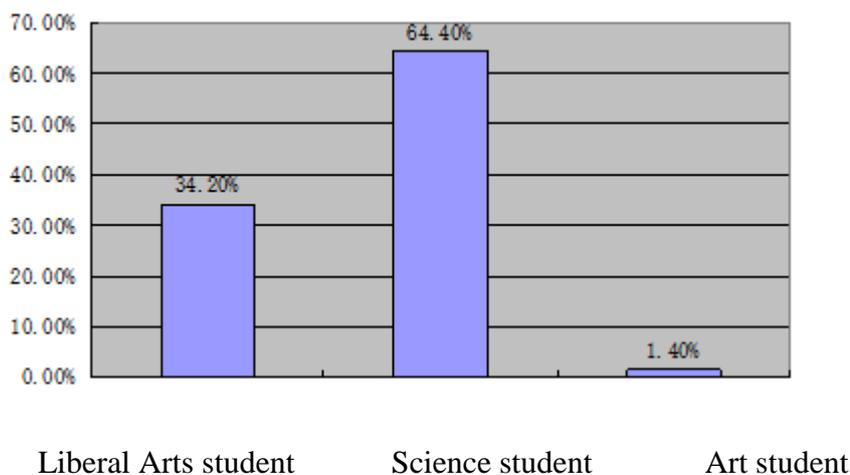


Fig. 2 Proportion of arts and sciences among students surveyed

The database contains a large amount of information about the individual, family and school of the senior students in high school, and obtains the cognition of the surveyed students about higher education and institution of higher learning.

Senior students in high school were required to answer ten questions in the questionnaire as shown in Table I, which in turn correspond to the risks of academic completion, employment and income acquisition. The students' cognition level of the three types of risks was obtained by choosing the frequency of "totally agree-totally disagree".

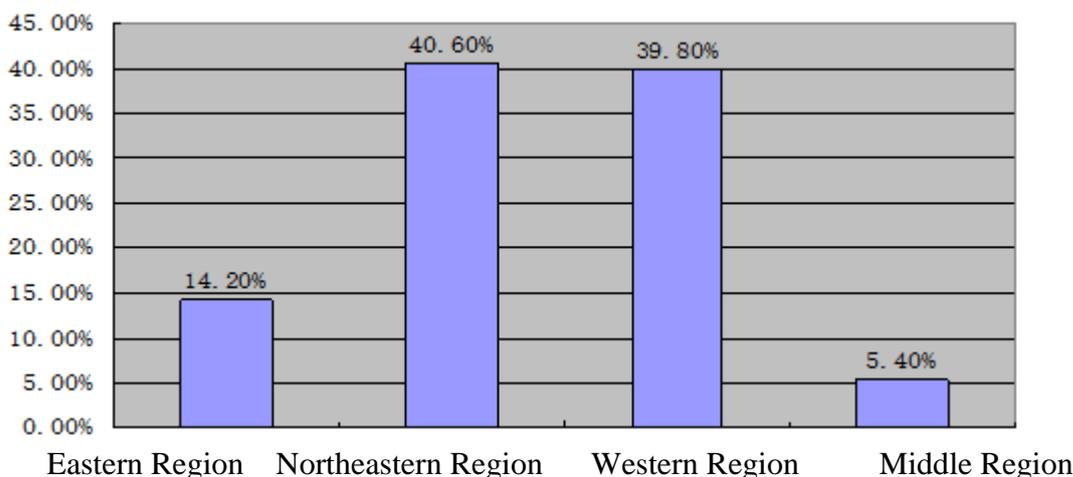


Fig. 3 Proportion of surveyed students from different regions in the whole population

Table I. Design of questionnaire

Items	Totally agree	Agree	Basically agree	Less agree	Totally disagree
1. Only a cram is needed before exams in the college because they are so easy.	①	②	③	④	⑤
2. It's easy to graduate from college.	①	②	③	④	⑤
3. College doesn't always lead to a good job.	①	②	③	④	⑤
4. A higher academic degree makes it easier to find a job.	①	②	③	④	⑤
5. You can get a better job if you go to a famous college.	①	②	③	④	⑤
6. It is easy to find a good job in the future by choosing a popular major.	①	②	③	④	⑤
7. College doesn't necessarily translate into a high income.	①	②	③	④	⑤
8. A higher academic degree leads to a higher income.	①	②	③	④	⑤
9. You will get higher salary in the future if you go to a famous college.	①	②	③	④	⑤
10. You can earn more in the future if you choose a popular major.	①	②	③	④	⑤

IV. Statistical results of data

Table II shows the answers of 3,605 senior students in high school to the above ten questions.

Table II. Answers to questions

	Proportion of people who agree with this view (including basically agree, agree and fully agree) (%)
1. Only a cram is needed before exams in the college because they are so easy.	20.1
2.It's easy to graduate from college.	31.6
3.College doesn't always lead to a good job.	85.3
4. A higher academic degree makes it easier to find a job.	63.9
5.You can get a better job if you go to a famous college.	57.5
6.It is easy to find a good job in the future by choosing a popular major.	47.9
7.College doesn't necessarily translate into a high income.	87.5
8.A higher academic degree leads to a higher income.	49.4
9.You will get higher salary in the future if you go to a famous college.	43.1
10.You can earn more in the future if you choose a popular major.	36.8

According to Table II

4.1 Senior Three Students' Attitude towards the Risk of College Completion is Cautious but not Optimistic.

According to the statistics, 20.1% of the students think that "only a cram is needed before exams in the college because they are so easy.", and 31.6% of the students think "it's easy to graduate from college", indicating that the senior students in high school still hold a cautious attitude towards the difficulty of completing their studies after entering the college in the future. However, it cannot be ignored that one-fifth and one-third of them still hold a perfunctory and contemptuous attitude towards university academic examinations and professional studies, which is worthy of vigilance.

The safe-deposit box-type education of "being strict in admission but slack in graduation" in China's colleges and colleges has made it a conclusion taken for granted by the vast majority of the public that "You can definitely graduate when you go to college.". Although in recent years almost all colleges and colleges in the country have clearly stipulated the relevant policies of eliminating students for not completing their studies, the news that colleges and colleges are urging students to quit will still cause controversy, especially in the current situation where diplomas are the gateway to employment. The serious consequences of not getting a diploma have pushed the elimination beyond the public's capacity. According to media reports, the percentage of students dropping out of two colleges in Zhejiang ranged from 1% to 1.5% for each year. A teacher from the academic affairs office said, "many parents find it hard to accept because they have made great efforts financially and mentally and the society is not ready to accept children who have dropped out of school."

4.2 The Assessment of the Employment Risk and Income Acquisition Risk Level of " High Academic Qualifications, Famous Colleges and Popular Majors" is too Low

According to the survey data, 85.3% of the students believed that "college does not necessarily lead to a good job", and 85.7% believed that "college does not necessarily translate to a high income". Seemingly, students have rational expectations about the employment and income prospects that will be brought by the high academic qualifications in the future. At the same time, however, the data results also show that more than half of high school graduates are too optimistic about the employment risk and income gain risk assessment of choosing "high academic qualifications, famous colleges and popular majors":36.8% of the students believed that "they can earn more in the future if choose a popular major", 49.4% believed that "a higher academic degree leads to a higher income", 43.1% believed that "they will get higher salary in the future if go to a famous college", 63.9% believed that "a higher academic degree makes it easier to find a job", 57.5% believed that "they can get a better job if go to a famous college", and 47.9% believed that "it is easy to find a good job in the future by choosing a popular major".

Before the third year of senior high school, I felt that I will definitely get a high salary after employment as long as the college was famous, no matter what major I studied. Later, when I was in the third year of senior high school, my parents sometimes told me that even if the school is famous but the major is not good, it will not be easy to find a job in the future. Then I felt it was more difficult and I didn't know how to choose. (A senior student in No. 176 High School of SY)

By contrast, the salary of QH graduates is definitely higher than that of YD graduates. After all, being admitted to QH after taking an examination of more than 700 points requires a lot of efforts. Of course, they will earn more. (A student from No. Three Middle School of YT)

When filing the intentions for university, students easily rush to choose the so-called popular majors, especially medicine, architecture, and economics and management, while few students choose languages, agriculture and forestry. Teachers can only suggest choosing according to students' interests. According to media reports, there are more college students and the unemployment rate of college students is much

higher. Therefore, considering the future employment problem, students will think that the employment rate of popular major is relatively high. However, those professional positions that are urgently needed by the society cannot be guaranteed due to employment problems, which makes people unwilling to take risks. (Vice-principal of LS Middle School)

This seemingly contradictory psychology also confirms the popular saying that "You can find a good job only by studying in key universities. It is better not to study in ordinary colleges." Whether it is the pursuit of famous-brand colleges and universities, famous-brand majors or the belittling of ordinary colleges and universities, it is because they are not clear about the key factors that determine income and employment. There is no denying the fact that the employment statistics results often show that the higher the educational background, the higher the income, the higher the probability of getting a better job; the more famous the school is, the more likely the graduates will get a high income and a good job; the more "popular" the major you study, the more likely you are to get a high salary and a good job. However, these are all high-probability events, and the sufficient conditions leading to the increase in probability are that the higher the educational background, the better the colleges and universities and the better the majors, the higher the human capital the individual obtains and the stronger the production capacity, and the higher the value added when put into production. As a result, the higher the remuneration returns, the better the working environment. People often only see the results but not the conditions, which creates a perfect illusion of higher education in hearsay [9].

V. RESULT ANALYSIS

5.1 Incomplete Information Leads to High School Students' Ignorance of College Study

In the real world, almost all markets are asymmetric markets with incomplete information that producers cannot accurately predict changes in the supply and demand of a variety of products in the market, consumers cannot accurately identify the quality of all goods. In the job market, job seekers can't get all the information of jobs, and employers can't understand the employment purpose and employability of each job seeker.

Just like all markets, the higher education market is also an asymmetric market with incomplete information. The individual choice behavior of higher education is caused by certain needs and motives, which are based on people's existing images, cognition and judgment of higher education-related information. All images, cognition and judgment that people have are the reflection of the subject to objective information. "In all knowledge-based service markets, consumers face difficulties in judging the quality of these services, not only before but also after receiving the services." [10] Compared with students and their parents, the implementing agencies, policy makers and employers of higher education obviously have information advantages in higher education services, higher education management and student employment. In the process of choosing higher education, individuals largely rely on external information transmission methods, such as the so-called authoritative figures, public media and self-promotion from universities to obtain, identify and screen information. The lack of information

resources and the uncertainty of information content may constitute the incomplete and inaccurate acquisition of personal information, leading to the information disadvantage of individuals.

Such incomplete information can easily lead to a huge gap and cognitive error between individuals' perception of higher education and the reality of higher education. In the process of questionnaire survey and interview, the researcher also investigated the high school students' access to information related to higher education, their cognition, and their information inquiry and interpretation ability. The survey shows that senior high school students are in a decision-making environment with incomplete information when choosing higher education entrance opportunities, and their mastery of information is inadequate and inaccurate, which is shown as follows: (1) There are few channels for individuals to obtain information. On the one hand, there are fewer channels that can provide rich and effective information for individuals than traditional ones; on the other hand, the weak information perception of individuals leads to fewer information sources that individuals actively occupy. (2) Individuals have errors in their cognition of relevant information. According to the respondents' answers to the questionnaire, individuals not only have one-sided understanding of the study in colleges, but also have different degrees of ignorance or deviation in such aspects as the cost of receiving higher education, the economic benefits of investing in higher education, social benefits, professional learning in the colleges, professional employment, higher education quality evaluation, higher education personnel training, etc.

5.2 Three Reasons Lead High School Students to Overestimate the Expected Benefits of Higher Education

First, "two production processes" are confused. Professor Qi Yeguo believes that students' higher education in colleges and universities is a production process in which time, money, physical strength and intelligence are invested, where the education and teaching service information provided by schools is the raw material of production, and the increase of students' personal human capital is the product. When students enter the labor market and put in labor, they enter a new social production process. One of the production factors of this process is the human capital of students, which produces tangible or intangible final products. People's high and wrong expectations of the economic benefits from higher education are basically the confusion of the two production processes. They confuse the capital gains (human capital increment) in the form of tuition fees and time with the labor value compensation (wage income). Personal employment and wage income depends on the supply and demand of labor force and the value increment he creates in the production process, rather than the amount of tuition fees paid, the length of schooling and the reputation of the institution [11].

Secondly, the traditional concept of education has not changed. One of the important reasons why the public generally have unrealistic expectations for higher education is that the traditional educational concepts have not changed in time with the development of the times. After the establishment of the imperial examination system in the Sui and Tang dynasties, the common people could change their personal identity and status as long as they passed the imperial examinations at the provincial level after ten years' study. As the sayings go, "A good scholar will make an official", " Reading helps us learn so

much about beauty and truth that we can live a better life in our own ways", which show that this concept of clearly taking education as a means to change the fate of individuals and even families has been deeply rooted in people's hearts since ancient times. In 1981, the State Council's *Report on Improving the Distribution of Graduates from Regular Institutions of Higher Learning in 1981* stipulated that the previous system of distribution of graduates from colleges and universities was once again restored. As graduates were distributed by the government and almost all units at that time were state-owned, college students had the function of "civil servants". Moreover, because they are scarce high-quality talents and play a prominent role in all units, they actually have the status of "cadres". Therefore, although there is no detailed document stipulating that college students can obtain the status of "cadres" after graduation, people actually link "college students" with "national cadres" [12].

Since the expansion of enrollment in 1999, the number of college students has increased rapidly. After 2002, the number of college students has leaped from elite higher education to the era of popularization. As a result, the "chosen one" who once competed with tens of thousands of candidates is now only a "common worker" among the masses. From the perspective of data, ordinary college graduates have accounted for half and more of the newly-increased employment population in cities and towns since 2010. The entry of higher education development into the era of popularization means that the employment of college graduates has also entered the era of popularization. However, the transformation of college students' social identity has not brought about the change of people's employment concept, most of which stays in the era of elite education.

Thirdly, it is influenced by "survivor bias", a common logical fallacy ("fallacy" instead of "bias"), which means that one only sees the results of a certain kind of screening without realizing the screening process and the data that fail the screening, and therefore considers some facts as the whole truth. The "survivor bias" that has led people to overestimate their economic returns has two manifestations: Firstly, people learned from others through oral or personal observation, or through the internet, newspapers, TV media and other channels that others have succeeded several years after graduating from college and came to the conclusion that such achievements can be achieved after college. Not to mention whether the key factor of success is college education or other accidental factors, people are covered by the halo of a few successful people. What is behind the halo is more ordinary workers who work in ordinary jobs after college. Second, most people who advocate "reading is useless" will give examples of people who went to work instead of going to college, but now they have a lot of assets, factories and a high salary. Looking back at their embarrassing income far behind by their peers, they can't help lamenting, "Why did I spend so much time and so much money than others, but I didn't get the high return I deserved?"

Similarly, statistically speaking, the career development prospects and income level of groups with higher education are higher than those without higher education. Workers with low educational background are mostly engaged in low-income, low-welfare and low-skilled jobs, which are mostly found in the secondary labor market, with poor stability of employment and income and poor working environment. Only a few successful people without university diplomas have received media attention and are widely spread. If one has to ask why people can casually mention these extreme exceptions, it may

seem that there are quite a few, but in fact it is mostly the "survivor bias" caused by "backfill bias", which is mostly used in the investment field and refers to the fact that only successful funds usually report their own performance.

VI. DISCUSSIONS

In Chinese society, the collectivist national character based on family and family makes receiving higher education not only an individual choice, but also an important matter for the whole family. What's more, the whole family will even be mobilized to support their children's higher education. Therefore, the success or failure of higher education choices is, in a sense, related to the living conditions of the whole family.

From the perspective of personal consumption of higher education products, the consumption of higher education products is non-repetitive and highly imperceptible. In the case of inaccurate cognition of various risks and underestimation of risk level, the final decision made by individuals is often irrational. If high school students find that they make mistakes in decision-making after entering the college, the cost of changing or terminating consumption is huge, not only the high economic cost, but also the "sunk" time cost and psychological cost.

Through the investigation of this study, it is found that senior high school students generally don't have the serious and rational understanding of the three types of risks they face when investing in higher education. The reasons are that students and parents have very limited knowledge of information related to higher education, so they usually collect indirect experience and direct information through various channels before making decisions in order to reduce purchasing risks, and that besides self-judgment, they mainly rely on external information transmission methods such as so-called authoritative people, public media and self-promotion from colleges and universities for information acquisition, information identification and screening. Therefore, it can be concluded that incomplete information release in colleges and universities, unsmooth information transfer between colleges and secondary schools, nonstandard social media dissemination, weak perception of individual information, lack of development guidance courses in secondary schools, and weak guidance ability of teachers and parents have all contributed to the existing risk perception of high school students. In order to improve senior high school students' risk perception level, measures should be actively taken, such as confirming public demand, enriching information disclosure content, establishing government-led or controlled information intermediaries, establishing long-term effective information transmission mechanism, developing individual academic development guidance, standardizing media information dissemination, etc. to minimize the decision-making risk.

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