

Фу Яньцзюнь,
аспірант факультету економіки та
менеджменту Сумського національного
аграрного університету;
Хенанський інститут науки і технологій

Fu Yanjun,
PhD student,
Sumy National Agrarian University,
Henan Institute of Science and Technology,
<https://orcid.org/0000-0002-9356-757X>

**MODERN FINANCING TOOLS AND THEIR RISKINESS IN THE CONTEXT OF INNOVATIVE
DIRECTIONS OF DEVELOPMENT OF EDUCATIONAL INSTITUTIONS
СУЧАСНІ ІНСТРУМЕНТИ ФІНАНСУВАННЯ ТА ЇХ РИЗИКОВІСТЬ У КОНТЕКСТІ
ІННОВАЦІЙНИХ НАПРЯМКІВ РОЗВИТКУ ЗАКЛАДІВ ОСВІТИ**

Фу Яньцзюнь Сучасні інструменти фінансу-
вання та їх ризиковість у контексті іннова-
ційних напрямків розвитку закладів освіти.
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The article aims to analyze and assess the risks of lending projects in China's higher education field. The following research methods are used: survey-analytical, systemic analysis, and synthesis. It is emphasized that China must strongly support the development of private educational institutions, attract all possible resources to invest in the higher education industry, and constantly improve the quality of teaching in higher education institutions, which will contribute to the future economic growth of the territories. It has been proven that credit projects in higher education institutions have differences in identifying potential risks compared to lending to the real sector of the economy. It has been argued that the public nature of higher education and the autonomy of private colleges and universities make private colleges and universities responsible for paying principal and interest on loans. On the other hand, under certain circumstances, private colleges and universities can transfer credit risk to the government through appropriate legislative measures. The risk management evaluation system should have five levels: environment, risk assessment, management activities, information and communication, and internal development. These five levels are considered the leading indicators, each of which highlights the key elements of risk management. The hypothesis has been proven that banking institutions should build a risk assessment system based on the main characteristics of educational institutions with tools for effective risk management. It is calculated that educational institutions belong to organizations with high risk. The prospects of the study consist in the further substantiation of the main instruments of adoption, transfer, and reduction of the degree of risk of lending to educational institutions.

Keywords: loan, risk, risk management, banking institutions, educational institutions, economic growth, efficiency, innovations.

Метою статті є аналіз та оцінка ризиків кредитування проектів у сфері освіти Китаю. У роботі використані такі методи дослідження: оглядово-аналітичний, системного аналізу та синтезу. Наголошується, що Китаю необхідно рішуче підтримувати розвиток приватних закладів освіти, залучати всі можливі ресурси для інвестування в індустрію освіти та постійно покращувати якість викладання у закладах освіти, що у майбутньому буде сприяти економічному зростанню територій. На прикладі показано, що загальний річний дохід університету-боржника становить близько 190 мільйонів юанів, а його основним джерелом доходу є оплата за навчання та різні збори. З точки зору джерел доходу з 2016 по 2020 роки, навчання та різні збори становлять 82,72%~88,56% від загального доходу. На відміну від підприємств, позики закладам освіти не покликані вирішити дефіцит коштів для виробництва, експлуатації та довгострокового розвитку. Отримані кредитні кошти використовуються задля покращення роботи закладів освіти та якості викладання. Доведено, що кредитні проекти у закладах освіти мають відмінності стосовно ідентифікації потенційних ризиків порівняно з кредитуванням реального сектору економіки. Констатується, що послуги, які надають заклади освіти, належать до квазісуспільних благ. Навіть якщо існують певні відмінності між приватними та державними коледжами та університетами, атрибут квазісуспільних благ їх послуг все одно існує. Обґрунтовано, що публічність закладів освіти та автономія приватних коледжів та університетів змушують приватні коледжі та університети нести відповідальність за виплату основної суми боргу та відсотків за кредитами. Система оцінки управління ризиками повинна складатися з п'яти рівнів: управлінського середовища, оцінки ризиків, управлінської діяльності, інформації та комунікації та внутрішнього розвитку. Ці п'ять рівнів розглядаються як основні. Кожен з наведених рівнів має власні елементи управління ризиками. Доведено гіпотезу про те, що банківські установи повинні будувати систему оцінки ризиків відповідно до основних характеристик діяльності закладів освіти. Прораховано, що навчальні заклади належать до категорії організацій з високим ступенем ризику. Перспективи дослідження полягають подальшому обґрунтуванні основних інструментів прийняття, передачі та зниження ступеня ризику кредитування закладів освіти.
Ключові слова: кредити, ризик, управління ризиками, банківські установи, заклади освіти, економічне зростання, ефективність, інновації.

Introduction

Fund support is an essential pillar of enterprise and economic development, and bank loans are the primary channel for enterprise financing. Relevant data show that more than 62% of the business

of Chinese commercial banks is credit business, so credit business is the primary profit source of Chinese commercial banks. However, with the increasingly fierce market competition, enterprises face more significant risks and uncertainties in the modern market economy. Therefore, there are also more significant risks in the loans provided by commercial banks. The risk brought by the loan business has become the leading risk Chinese commercial banks face. With the continuous reform of China's commercial banks and the continuous improvement of the financial market, credit risk management has become an urgent problem for China's commercial banks. Although China's commercial banks have initially established a risk management system, it is still exploratory. Compared with the risk management system of commercial banks in developed countries, the risk management system of Chinese commercial banks could be better.

With China's higher education reform, private higher education has developed rapidly. The development of private colleges and universities is of positive significance to reforming China's education supply and improving the teaching quality of Chinese colleges and universities. In the outline of the national medium and long-term education reform and development plan (2010-2020) promulgated by China, it is clearly stated that China needs to vigorously support the development of private education in many aspects of education reform and development, encourage all resources to invest in the higher education industry, and constantly improve the teaching quality and teaching level of China's higher education, Actively explore the development model of private higher education. Local commercial banks have also provided financial services to develop China's private higher education. The loans provided to private higher educational institutions (PHEI) have increased rapidly in a short period. The rapid growth of loan mode has also brought potential risks to commercial banks. While providing loans to PHEI, commercial banks must also strengthen risk management. Only in this way can they improve the profitability of commercial banks and realize the sustainable development of commercial banks. Effective risk management of commercial banks is the primary way and measure to avoid loan risk.

The works of scientists and practitioners are devoted to the theoretical aspects, problems, and prospects of the use of modern financing tools, and assessment of their riskiness in the context of innovative directions of development of educational institutions, including Di G. [1], Chen H. J. [2], Chen S. [3], Christian R. [4], Ingars E. [6], Leung W.S. [7], Marquez-Ramos L., Mourelle E. [8], Scott H., Ames M. [9]. However, in scientific works, more attention should be paid to risk assessment in lending at public and private universities, considering the specifics of China.

Formulation of the goals of the article

This paper aims to study the risk analysis of private higher education loan projects by commercial banks and construct a targeted evaluation system. Therefore, assumptions include H1: the loan projects of PHEI have different risk characteristics from enterprises; H2: Commercial banks must build a risk evaluation system for loan projects of PHEI; H3: commercial banks build a risk assessment system according to the characteristics of PHEI, which can better provide services and effectively reduce their risks.

Presentation of the main research material

Table 1. Proportion of income and expenditure of debtor SQ University (%)

categories		years				
		2016	2017	2018	2019	2020
sources income	miscellaneous fees	88.52	88.56	85.36	83.52	82.72
	school run enterprises	5.98	6.03	8.21	9.36	8.02
	real estate lease	3.52	3.45	4.41	4.99	7.12
	others	1.98	1.96	2.02	2.13	2.14
expenditure	teaching expenses	19.17	20.45	23.31	21.19	22.64
	faculty salaries	19.76	21.71	21.42	22.13	24.56
	administrative office expenses	15.35	13.75	17.29	12.81	21.33
	marketing and publicity expenses	13.26	18.38	20.51	18.49	19.43
	constructive expenditure	32.61	25.89	17.44	25.36	12.07

includes two parts: recurrent and constructive (Table 1).

The total annual income of colleges and universities is about 190 million yuan.

Colleges and universities need to spend money every year and borrow from banks to solve the problem of the capital gap. According to the estimation, the debtor SQ University plans to borrow 763 million yuan from the bank for the new campus construction project, with an annual repayment of

Taking the debtor SQ university loan project as a specific case, this study identifies the loan risk of private universities through the Delphi method. Further, it obtains the problems and deficiencies in the risk management environment, risk identification, management activities, and informatization through systematic evaluation. At present, the primary source of income of SQ universities is tuition and miscellaneous fees. From 2016 to 2020, tuition fees account for 82.72% - 88.56% of the total income of colleges and universities. From the expenditure perspective, the primary support

84.72 million yuan. It takes 14 years for the university to repay the bank loan. The total loan interest and principal and interest paid were 367753400 yuan and 1130753300 yuan, respectively.

Based on the project risk management theory, this paper sets up detailed investigation questions about China's guidelines on risk management of commercial banks, basic norms of enterprise risk management, and other relevant policies and standards, combined with work practice and the construction project of the new campus of SQ University.

Twelve people were selected to participate in the study. The specific personnel composition is five internal loan managers of HX Bank, three university project managers, and four sub-control departments of superior branches. In the risk survey, the anonymous survey method is adopted. Each

Table 2. Composition of experts

Numbers	Surname	Unit and position
1	Jiao	Project risk management manager of a bank PHEI
2	Li	University Loan Risk Management Manager of a bank
3	Shen	Loan project supervisor of a bank PHEI
4	Huang	Professor of financial management in a university
5	Zhang	Professor of financial management in a PHEI
6	Ma	Professor of financial management in a public university
7	Wu	Loan project supervisor of a bank PHEI
8	Fu	Loan project supervisor of a bank PHEI

person issues a questionnaire. A total of 12 questionnaires were distributed and recovered. Ten valid questionnaires are obtained from the questionnaire, summarizing the risks of PHEI loan projects.

In this survey, an expert group composed of 8 different experts was selected (Table 2).

The risk management system is divided into five levels Combined with the expert scoring structure and the actual situation of the project: management environment, risk assessment, management activities, information and communication, and internal perspective. These five levels are used as hands; detailed indicators are set under each level to form the risk management system.

The risk management environment is mainly investigated and identified from the risk management organization's structure, concept, human resources, and culture. Regarding risk assessment, investigation and identification are mainly carried out from indicators, systems, new business assessment, incompatible responsibilities, and authorization approval. In management activities, the investigation is primarily carried out in two parts: performance appraisal and internal audit. In terms of information and communication, the study is primarily carried out through the information system and the internal communication of the bank; internal supervision explicitly includes bugs.

According to the setting of risk management factors, the specific situation of the debtor SQ University loan risk management index system established in the analysis and research is shown in Table 3.

After constructing the index system, this paper sets the index evaluation language set. It is set as five risk levels: A, B, C, D, and E, corresponding to 85-100, 70-84, 60-69, 40-59, and 0-39 points, respectively. In the risk index system, there are significant differences in the importance and role of different index systems for the risk management effect of the Z branch debtor SQ University loan project. Therefore, it is necessary to set the weight value of each quality assurance in the index system. In determining weight value, the expert group scores, then takes the geometric average value, obtains the average score, calculates the importance of different indicators, establishes a judgment matrix, and finally calculates the weight values of primary and secondary indicators. Clarify the weight of primary indicators and calculate the judgment matrix of primary indicators and specific weight values, as shown in Table 4. According to the calculated weight value $\lambda_{Max} = 4.0179$, $Cr = 0.0440 < 0.1$, indicating that it has passed the consistency test.

Determination of the weight of secondary indicators, the weight value, and the influence degree of each secondary indicator system under the five primary hands are shown in Table 5 and Table 9, respectively. The secondary indicators under the risk management environment are obtained through calculation $\lambda_{Max} = 4.0592$, $Cr = 0.0197 < 0.1$, the calculation results pass the consistency test and meet the requirements.

Table 3. Risk management system of SQ University loan project, debtor of Z branch of HX Bank

Target layer	Factor layer	
	Primary index	Secondary index
Z branch debtor SQ University loan risk management	Management environment U1	Organizational structure U11
		Human resources U13
		Management philosophy U12
		Management culture U14
	Risk assessment U2	Evaluation index U21
		Evaluation system u22
		New business assessment U23
		Incompatible responsibilities U24
		Authorized approval u25
	U3 management activities	Performance appraisal U31
		Internal audit U32
	Information and communication U4	Information system U41
		Internal communication U42
	Internal oversight U5	Budget management U51
Contract management U52		

Table 4. Weight values of primary indicators

	U1	U2	U3	U4	W
U1	1	2	3	4	0.4632
U2	1/2	1	1	4	0.2407
U3	1/3	1	1	4	0.2219
U4	1/4	1/4	1/4	1	0.0743
U5	1/5	1	1	4	0.2605

Cr = 0.0197 < 0.1, the calculation results passed the consistency test and met the requirements.

Through calculation, the secondary indicators under internal control are obtained λ Max = 4.0592, Cr = 0.0197, the calculation results passed the consistency test and met the requirements.

By identifying risks, it is concluded that in the debtor's SQ University new campus construction loan project, ten factors may lead to loan risks. Therefore, focusing on these ten items in risk management is necessary. Specifically, the causes of these ten risks mainly include organizational structure, human resources, culture, evaluation indicators, evaluation system, new business evaluation, authorization approval, performance appraisal, internal audit, and information system.

In the risk assessment of loan projects, all risk elements will impact the assessment results of loan risk. Firstly, in the risk assessment, the risk level of U1 is calculated using the fuzzy assessment method. In calculating the risk level, firstly, the evaluation matrix of a single factor is established respectively. The established risk factor set is $X = \{x_1, x_2, x_3\}$. In the calculation, the result is obtained through weighted balance processing according to the results scored by experts. The evaluation performance of the risk management environment is

Table 7. Weight values of indicators under management activities

U3	U31	U32	W
U31	1	3	0.2695
U32	1/3	1	0.1722

U11 = $\{R_1, R_2, R_3\}$, which belongs to the collection within the scope of U. Risk means that the I and j conditions may lead to the attribution of risk probability to the K (k = L, 2, 3, 4, 5) level in the evaluation. In the risk assessment, the specific risk situation can be clarified through the assessment indicators, which can be calculated and analyzed by suitable methods such as the fuzzy distribution method, maximum membership degree method, and weighted average method. During the weighted average method analysis, each index is centrally processed through normalization measures. After the centralized processing, the weight value of the evaluation element can be obtained, and then the weighted evaluation processing is carried out according to the calculated weight value. The main feature of the risk assessment set is non-quantitative. In the specific calculation and analysis, it is necessary to quantify the processing indicators and then multiply the hands and values. In the research, the possibility of risk is divided into large, large, medium, and tiny, corresponding to P1 = 0.9, P2 = 0.7, P3 = 0.5, P4 = 0.3, and P5 = 0.1, respectively. Fuzzy distribution method: In the analysis, the possibility of risk is divided into large, large, medium, small, and minor. During calculation, the accuracy of calculation results can be improved through

Table 9. Weight values of indicators under internal supervision

U5	U51	U52	U53	U54	w
U51	1	3	1/2	3	0.2695
U52	1/3	1	1/5	3	0.1722
U53	2	5	1	5	0.4792
U54	1/2	2	1/3	1	0.1791

normalization. Comprehensive assessment of "secondary index risk." During risk assessment, it is necessary to calculate the degree of loss caused by the risk. The method used in measuring the degree of risk loss is consistent with the risk occurrence probability measurement method. To ensure the accuracy and objectivity of risk assessment, it is necessary to evaluate all project risk factors comprehensively. The specific evaluation results are shown in Table 10. The first level is comprehensive risk assessment. Construct the factor set. The risk factor set of Z branch's private higher education institution loan business is expressed as combined with the risks mentioned above: $X = \{x_1, x_2, x_3\}$. After establishing the basis of the risk factor set, determine the total station sum of each factor. The above operations obtain the risk weight matrix, as shown in Table 11. Based on the risk matrix W, normalize each column to obtain the judgment matrix as shown in Table 12.

The secondary indicators under risk assessment are obtained through calculation λ Max = 5.0680, Cr = 0.0151 < 0.1, the calculation results pass the consistency test and meet the requirements.

The secondary indicators under management activities are calculated λ Max = 4.0592, Cr = 0.0197 < 0.1, the calculation results passed the consistency test and met the requirements.

The secondary indicators of information and communication are obtained through calculation λ Max = 4.0592,

Table 5. Weight values of secondary indicators under risk management environment

U1	U11	U12	U13	U14	W
U11	1	4	1	5	0.3426
U12	1/4	1	1/4	3	0.2326
U13	1	4	1	5	0.3426
U14	1/5	1/3	1/5	1	0.1422

Table 6. Weight value of each index under risk assessment

U2	U21	U22	U23	U24	U25	W
U21	1	3	1/2	2	4	0.2595
U22	1/3	1	1/5	1/2	2	0.0918
U23	2	5	1	3	5	0.4301
U24	1/2	2	1/3	1	3	0.1578
U25	1/4	1/2	1/5	1/3	1	0.0606

Table 8. Weight values of indicators under information and communication

U4	U41	U42	w
U41	2	5	0.4792
U42	1/2	2	0.1791

After normalization, the weight values of three factors can be obtained, specifically: $A = \{0.6556, 0.2648, 0.0796\}$. After the weight value is obtained, a consistency test is required. Through calculation, $CI = 0.0163$ and $RI = 0.59$, and then the consistency index can be calculated. The consistency index is $CR = \frac{CI}{RI} = 0.028 < 0.1$, the calculation results show good consistency. Then we get: $A = \{a_1, a_2, a_3\} = \{0.6457, 0.2677, 0.0787\}$. The total evaluation data of the risk occurrence probability is calculated on this basis. The evaluation criteria are processed after the calculation is completed.

Table 10. Risk assessment results

Risk level	Scores	illustration
Extremely high	9-10	The risk is very high
Very high	8-9	Great risk
high	7-8	High risk
moderate	6-7	At risk
low	3-6	Low risk
Extremely low	0-3	Very little risk

The evaluation matrix, weight set, and factor set of all secondary indicators in the constructed risk assessment system are calculated. Specifically, the calculation results are shown in Table 13.

Conclusions and prospects for further research

The analysis of this study shows that the loan projects of PHEI have different risk characteristics from enterprises, namely concealment, uncertainty, and latency, which is

consistent with the theoretical hypothesis H1. Therefore, the theoretical hypothesis H1 is accepted. The income and payment of PHEI are stable for a specific time. The total annual income of the debtor SQ university is about 190 million yuan, and its primary source of income is tuition and miscellaneous fees. From the perspective of income sources from 2016 to

Table 12. Judgment matrix after normalization

U1	U11	U12	U13	Sum according to TF
U11	0.6774	0.7059	0.5833	1.966
U12	0.2258	0.2353	0.3333	0.7944
U13	0.0968	0.0588	0.0833	0.2389

2020, tuition and various fees account for 82.72%~88.56% of its total revenue. In terms of expenditure, SQ college teaching expenditure is one of the most critical expenditures, accounting for about 20%. Different from enterprises, college loans are not to solve the shortage of funds for production, operation, and long-term development. The obtained loan funds need to improve the school's running ability, teachers' level, academic work, and other aspects.

Therefore, for colleges and universities, the investment benefits of loans cannot be reflected by enterprises, and there is certain concealment. This characteristic also leads to the significantly reduced predictability of commercial banks for the loan income of colleges and universities. It increases the loan risk of commercial banks to a certain extent. At present, the valuation of the assets of colleges and

Table 13. Risk probability expectation and loss expectation

Primary index	Secondary index	Probability expectation	Loss expectation
Management environment U1	Organizational structure U11	0.686	6.276
	Human resources U13	0.184	3.361
	Management culture U14	0.295	5.153
Risk assessment U2	Evaluation index U21	0.745	5.549
	Evaluation system U22	0.542	6.676
	New business assessment U23	0.304	2.710
	Authorized approval U25	8.628	0.752541
U3 management activities	Performance appraisal U31	8.033	0.143411
	Internal audit U32	6.267	2.037303
Information and communication U4	Information system U41	5.672	0.369897

Therefore, for colleges and universities in China could be more precise. It is difficult to quantitatively evaluate the effect of loans provided by commercial banks on the improvement of intangible assets of colleges and universities, so there is significant uncertainty. Therefore, this makes the loan risk supplied by commercial banks for colleges and universities have great potential. The products or services provided by colleges and universities belong to quasi-public goods. Even if there are some differences between private colleges and universities and public colleges and universities, the quasi-public goods attribute of their products still exists. On the one hand, the publicity of higher education and the autonomy of private colleges and universities

make private colleges and universities need to bear the responsibility of principal and interest repayment. On the other hand, under certain circumstances, private colleges and universities can transfer the loan risk to the government through corresponding measures to disperse the threat.

Therefore, the current research mainly focuses on enterprise loans, while there needs to be more research on the risk management evaluation system of loans from PHEI. This study makes up for this deficiency. This study's risk management evaluation system consists of five levels: management environment, risk assessment, management activities, information and communication, and internal perspective. These five levels are taken as primary indicators; detailed indicators are set under each primary hand to form a risk management system. The expert group scores the weight value and

Table 11. Risk weight matrix W

U1	U11	U12	U13
U11	1	3	7
U12	1/3	1	4
U13	1/7	1/4	1
Sum by column	1.4763	5.5	1.2

geometric average. Then, it calculates the importance of different indicators, establishes a judgment matrix, and calculates the weight values of primary and secondary indicators.

This study further uses the method of empirical analysis to verify the risk management evaluation system constructed by the Z branch of HX Bank according to the loan characteristics of PHEI, which effectively reduces its own risk. At the same time, detailed and objective data and evaluation reports are also conducive to the creditor SQ University to reasonably plan the financing amount and financing channels and promote the healthy and sustainable development of the University. This is consistent with the theoretical hypothesis H3. Therefore, the speculative hypothesis H3 is accepted. In the evaluation of the risk evaluation system constructed by the Z branch of HX Bank for the debtor SQ university loan project, the calculation result of the risk management environment belongs to general risk; The analysis of risk assessment belongs to high risk; The combined evaluation of risk probability and loss belongs to high risk; Finally, the total risk score is 6.7345, which belongs to high risk. It is concluded that the total risk result of the loan project of SQ private university, the debtor of Z branch, is grade B by evaluating the risk points of the loan project of XJ private university, the debtor of Y branch, and comprehensive analysis. Commercial banks can take targeted measures to reduce or avoid loan risks according to the score of risk categories. Commercial banks can choose to take risks, avoid hazards, transfer risks, convert risks, hedge risks, compensate risks, control risks, and other measures according to the comprehensive combination of individual scores. At the same time, commercial banks can use the targeted evaluation system to provide charging consulting services such as loan evaluation and financing planning for colleges and universities. PHEI can also use detailed and targeted evaluation results for development planning.

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