The Model for Financial Information Screening of Small and Medium-sized Enterprises in Laos: Based on the Information Economics

Joxiong Bouasinengma[1] , Huang Dechun[2] , Huang Yinwen[3]

Abstract

In recent years, small and medium-sized enterprises in Laos have played an important role in improving economic growth, creating job opportunities, and optimizing the industrial structure. However, the financing scale and financial status have made SMEs repelled and restricted by the Lao financial market. Also, the Information Asymmetry is one of the main reasons why SMEs can hardly obtain financial support, and it is also an important consideration for financial institutions to avoid loans. The purpose of this article is to examine the current situation of financing and credit of SMEs in Laos, analyze the financing problems of SMEs in Laos, and construct an information screening model for SMEs in Laos. The researcher

[1]Hohai University (Zuos@la.icbc.com)

[2]Hohai University (Huangdechun@hhu.edu.cn)

[3]Hohai University (Yhua113@hhu.edu.cn)

built the model through three main steps: 1. Identifying the financial and non-financial factors to use in the modeling; 2. Adopting the Altman's Z-score method (1968) to evaluate the credit risk from financial factors in (1.); and 3. Employing the Fuzzy comprehensive evaluation in creating an information screening model to prevent problems in SMEs financing in Laos. The model was applied to a local company in Laos. The results showed that when using the constructed model, comparing the financial and non-financial indicators from 2017 and 2018, the information quality index of the company in 2017 is higher, better than that of the company in 2018. This can be said that the information screening model for SMEs has a certain degree of operability. This article also provides theoretical support and practical solutions for corporate financing difficulties.

Introduction

In recent years, the Laos economy has maintained a medium-to-high-speed growth, with investment and private consumption being the main growth drivers of its economy. However, like many countries, Laos faced the problem of the Coronavirus-19 outbreak since 2019, thereby causing the inflation rate to rise up from under 2% to 9.9% in April 2022. Fortunately, according to the forecast from the World Bank Group, it is found that if continuing debt

renegotiations are successful and strict COVID-19 control measures do not reappear, Laos' economy is expected to develop by 3.8 percent in 2022, up from a projected 2.5 percent in 2021 (World Bank Group, 2022). It can be said that there is a certain potential for market development. The Lao small and medium-sized enterprises (SMEs) play an important role in promoting economic growth, creating job opportunities, and optimizing the industrial structure. Small and micro-enterprises, including family workshops and individual industrial and commercial households, constitute a group of SMEs in Laos and are an indispensable and important force in the development of Laos' national economy.

The financing situation emerges from the amount of information from the SMEs' owners. The improvement of the information enables local governments and financial institutions to have a more comprehensive understanding of the operating and financial status of SMEs, which is conducive to financial support for SMEs. An important reason why it is difficult for SMEs to obtain funding is the information asymmetry between financial institutions and SMEs. While it is difficult for SMEs to provide real financial data to support their operations, financial institutions are not likely to provide financial support to SMEs due to risk aversion. In addition, it is difficult for SMEs to compete with state-owned enterprises having ownership advantages as local governments tend to provide credit rationing support to state-owned enterprises, showing a squeeze on the loan space of SMEs.

To this end, this article analyzed the financing problems of Lao small and medium-sized enterprises based on the financing status of Lao small and medium-sized enterprises and the characteristics of the credit market. This present study combined the relevant theories of information economics and the development status of Laos to construct an information screening model for Lao small and medium-sized enterprises. Finally, this present study also provided theoretical support and practical solutions to corporate financing difficulties.

Overview of the Small and Medium-sized enterprises (SMEs) in Laos

The SMEs play an indispensable role in the process of technological progress and economic development. Not only are they an important part of the social-economic system, but also the most active and promising enterprise group in the market economy system (Long, 2015). In Laos, the definition of small and medium-sized enterprises is mainly measured by quantitative indicators such as the number of employees, total assets of the enterprise, and annual sales of the enterprise. According to the decree on SMEs Development Policies in Laos as cited in Kyophilavong (2017), SMEs are classified into micro-enterprises, small enterprises, and medium-sized enterprises according to the following criteria: "*small enterprises* – those with an annual average number of employees not exceeding 19 persons or total assets not exceeding 250 million kip or an annual turnover

not exceeding 4 hundred million kip. *Medium-sized enterprises* – those with an annual average number of employees not exceeding 99 persons or total assets not exceeding 1.2 billion kip or an annual turnover not exceeding 1 billion kip". Formerly, Laos had a weak social and economic foundation. Lao small and medium-sized enterprises were mainly based on relatively low-end industries such as handicrafts and service industries. In the recent years, according to the Asian Development Bank (2020) database, the total number of SMEs in Laos was 124,837 registered enterprises, 62.5% of those enterprises' businesses were wholesale and retail trade.

The financial support in Laos can be said to be relatively lagging, and the structure of financial instruments and products cannot meet the growing financing needs of small and medium-sized enterprises. This makes small and medium-sized enterprises generally face relatively strong financing constraints. At present, Lao companies mainly use indirect financing, and the way companies raise funds is relatively simple, mainly including financial allocations, bank loans, private loans, and venture capital. The financing support available to SMEs in Laos is often out of proportion to their contribution to employment and national economic growth. The flaws in the system also make Lao small and medium-sized enterprises at a competitive disadvantage. Most of the financial resources and financial support prefer large enterprises and state-owned enterprises.

The main factors affecting the financing of small and medium-sized enterprises in Laos involve not only the problems of the

enterprises themselves but also the constraints of the enterprises' external environment. From the perspective of the internal environment of enterprises, on the one hand, Lao small and medium-sized enterprises are dominated by traditional handicrafts and agriculture with low technological products. It is seen to be unable to form a stable cash flow and expected return on investment. Even if small and medium-sized enterprises obtain bank loans, compared with state-owned enterprises and large enterprises, small and medium-sized enterprises still need to pay higher floating interest rates, which greatly increases the financing costs of small and medium-sized enterprises. Therefore, most Lao small and medium-sized enterprises can only meet their capital needs through private financing.

Literature review
Overview of SME financing in Lao PDR

Financing SMEs face risk factors such as the lack of legal systems, the capital chain break in short-term financing, the high-interest rates, and development capabilities (Xiongzhi, 2018; Li, 2010). From the view of the Government-Market relationship, SME financing has both market risks and public risks; from a hierarchical perspective, it has both macro and micro risks (Fengqin, 2020) Xuexing (2020) divided the factors that affect the financial support for small and medium-sized enterprises into macroeconomic factors, micro-subject factors, and policy support factors. Cowling (2012) studied the impact of the economic cycle on the external financing of British SMEs and poined

out that the size of SMEs is directly proportional to the demand for external financing, and during the economic recession, the larger SMEs are more likely to obtain financing support. Lee (2014) empirically analyzed the impact of the economic cycle on the financing of British SMEs and concluded that SMEs in traditional industries are more susceptible to the impact of economic cycles than SMEs in technological innovation.

Studies on financing evaluation for SMEs have been also launched a series of models. Wang Xiuzhen (2017) used the Chinese industrial enterprise database to construct an evaluation index system for the financing efficiency of SMEs, including input and output indicators and used the Data Envelopment Analysis (DEA) method to measure and evaluate the financing efficiency of SMEs enterprises. Conducted transoceanic international trade based on the Fuzzy optimal decision model, and assessed the risk of transoceanic international trade (TIT) and public-private partnership (PPP)projects based on the gray correlation method. Zhang Mu (2019) introduced the Choquet integral in constructing a risk evaluation model of intellectual property pledge financing for big data companies. Guo Guancheng (2020) used the entropy method to establish a risk assessment model, and empirically analyzed the risk assessment of land loan finance in economically developed areas from four aspects: market characteristics, loan conditions, credit factors, and policy and legal factors. Xing Miao (2020) used

the analytic hierarchy process and the fuzzy comprehensive evaluation method to evaluate and compare the financing risks of typical high-tech SMEs.

In summary, the financing of SMEs enterprises has been discussed extensively and in-depth in academic circles. The difficulty of financing for SMEs is a common pain point all over the world. The main methods of corporate financing difficulties and the research on financing problems of SMEs are gradually developing in the direction of modeling.

Information asymmetry and Information screening

Information asymmetry is considered a main reason for the financing constraints of enterprises (Myer & Majluf, 1984). Akerlof (1970) pointed out that when the information obtained by each party does not go in the same direction, this is said to be the Information Asymmetry or Asymmetric Information. The Information Asymmetry in economics emphasizes the difference in the grasp of information that affects people's choice behavior (Shijia, 2011). The information-advantaged party has the motivation to obtain greater benefits by relying on the information superiority, thereby harming the interests of the information inferior party. The results caused by asymmetric information include two types: adverse selection and moral hazard. Stiglitz & Weiss (1981) used the concepts of adverse selection and moral hazard in financial market and believed that borrowers should be more aware of the possibility of success of

investment projects and the conditions and motivations for repayment of the purchase price than the borrowers, making it impossible for commercial banks to judge the loan risk and leading to the reverse of the loan project (Mu, 2013).

Under the condition of asymmetric information, the information superior party, the information inferior party, and the third party (that is, the government and other financial institutions) have certain motives and enthusiasm. Parties with disadvantaged information often use active information gathering and information screening to reduce information asymmetry. Joseph Eugene Stiglitz (1975) first put forward the concept of screening in his book. The basic premise is that the trustee has personal information, and the client only has public information. There is a certain degree of subjectivity and inaccuracy in acting under this kind of information asymmetry, which may lead to adverse selection and moral hazard. Spence (1978) studied the asymmetry of information on employee capabilities in the labor market, later establishing a signaling model from the perspective of the dominant-party system. Rothchild and Stiglit (1978) studied the asymmetry information of risks in the insurance market, and the information screening model was then established from the perspective of the information-inferior party.

Analysis of SMEs financing in Laos based on the Information Asymmetry

As you may know, borrowing money from different

 finan cial institutions is the primary source of SMEs' financial problems in Laos. Uneven information between lenders and borrowers is a contributing factor to this issue. In this study, the author describes two risks from the adverse selection and Moral hazard concepts to assess the issue.

I. Adverse selection risks: in the Lao credit market, SMEs and financial institutions have different information on financing projects. Generally speaking, SMEs have a clearer understanding of their own operating and financial status, while banks and other financial institutions have difficulty in obtaining the 'real' information. That is to say, the information between the two parties is different, or so-called 'asymmetrical'. Before signing the loan contract, the bank will conduct a pre-loan review of Lao SMEs and their financing projects. To reduce the issue of non-performing loans of state-owned banks, banks often strictly control the approval of various loan projects, and set higher interest rates to increase the financing costs of enterprises (see Table 1).

Table 1*: Deposit and Loan Interest Rates of Lao Commercial Banks in 2020

Loan Period	Deposit Rate	Lending Rate
>1 year	1.74%-4.82%	9.82%
1-3 years	5.39%-6.82%	10.61%
Above 3 years	6.89%-6.96%	10.78%

Source: Annual Economic Report 2020 (Bank of the Lao P.D.R, 2021)

Meanwhile, Lao SMEs lack a transparent credit management system. Under such circumstances, to increase their chances of obtaining financial support, those enterprises often choose to conceal or even provide false performance reports and financial information to mislead banks, which aggravates the possibility of getting loans from banks.

Table 2: Comparison of Information of enterprises in different sce narios (USD 10,000)

	Bank earnings		Bank expected income
	No default	Corporate default	
Scenario 1: Information Symmetry			
Company A	55	-50	55*0.96-50*0.04=50.8
Company B	110	-100	110*0.6-100*0.4=26
Scenario 2: Information Asymmetry			
Company A	55	-50	55*0.5-50*0.5=2.5
Company B	110	-100	110*0.5-100*0.5=5

From the table 2, suppose two SMEs, company A and company B, apply for loans from a commercial bank. Among them, company A borrowed a one-year loan of 500,000 U.S. dollars, and company B borrowed a one-year loan of 1 million U.S. dollars. A's default rate is 4% but B's default rate is 40%. To simplify the calculation, assume that the average loan interest rate is 10%. Under the premise of complete information symmetry, the bank will choose to

lend to company A. In the case of information asymmetry, the bank cannot fully grasp the business status, solvency, and other information of the company. So, it can only assume that the probabilities of default for A and B are both equal at 0.5. According to the calculation results, the bank will abandon company A. The choice of the disadvantaged company B causes the adverse selection problem of commercial banks in the process of lending to SMEs.

Therefore, the problem of adverse selection tends to force some small and medium-sized enterprises with lower risks and higher credit to miss bank financing opportunities and turn to other financing channels. At the same time, financial institutions may also miss high-quality customer resources, increasing potential loan risks.

II. Moral hazard usually occurs after the signing of the financing contract, and some SMEs use the superior information to choose financing options at will, thus harming the vested interests of the bank (Srithirath, 2022). Under the current financial environment in Laos, SMEs generally have problems such as low creditworthiness, lack of authoritative credit rating agencies, and a unified SME credit evaluation system. Compared with large enterprises, SMEs' production, customers, finance, and operating capabilities come in as private information, which is less disclosed to the public, and information transparency is low. After banks have issued the payment, some SMEs may engage in high-risk activities that the bank is unwilling to undertake out of their interests. For example, some SMEs are tempted by high profits to change the scope of use of funds promised in the

original contract; or use loans that should be used for investment for consumption expenditures. The existence of this kind of moral hazard may reduce the expected income of banks and other financial institutions, thereby affecting the willingness of financial institutions to extend loans to SMEs.

All in all, there is a serious information asymmetry in the SME financing market in Laos. The more serious the information asymmetry is, the greater the adverse selection risk and moral hazard will be; the higher the bank's information cost, the deeper the market imbalance, and the more difficult it may be for SMEs to raise funds. The theory 'Information Economics' believes that the establishment of a good information screening mechanism through signal transmission can reduce the hidden actions, hidden information, and adverse selection behaviors of enterprises. While helping investors solve the problem of information mismatch, it can alleviate the financing difficulties of small and medium-sized enterprises.

The model for financial information screening of SMEs in Laos

The construction of the SME financing information screening model is to identify low-risk borrowers through the evaluation of the information quality index; to provide a good environment for their financing; and, to reduce the increase in financing costs and moral hazards caused by adverse selection. In this article, the author divided the model construction procedures into three steps as follows:

I. The key ideas in building the model. The information screening model is that the party with public information first participates in the financial action to obtain and analyze the trustee's personal information, so the trustee's personal information becomes public information and the shared information (Xingxing & Chang zheng, 2012). This article is based on two screening mechanisms: the self-selection mechanism and testing mechanism, combined with the development of the investment and financing market in Laos, to identify relevant screening factors. It specifically includes three steps. (1) it is needed to make a preliminary screening based on financial indicators and non-financial indicators. The investor makes full use of the relevant information disclosed by the borrowers to systematically analyze the borrowers' relevant financial status, level of assets and liabilities, and solvency. In the process of information transmission, there may be situations in which the financing party may whitewash the report or delay the disclosure to achieve the financing purpose. (2) Therefore, evaluating whether a company has a good internal and external monitoring mechanism is crucial to reducing possible risks and correcting preliminary screening results. (3) It is the supplementary screening. As the Lao government pays more attention to SMEs, the credit investigation system of SMEs is constantly developing and improving. This related auxiliary information can help improve the probability of successful financing of small and medium-sized enterprises.

II. The model elements. According to the aforementioned three steps of preliminary screening, possible risk screening, and

supplementary screening, the analysis is carried out on the factors that have a greater impact on the information quality index.

(1) Credit risk. In the preliminary screening, the financial indicators and non-financial indicators of small and medium-sized enterprises are mainly analyzed to understand the basic credit level and solvency of an enterprise. Regarding the credit risk evaluation of enterprises, Altman (1968) proposed the Z-score scoring method. After screening by mathematical statistics, five financial ratio indicators that best reflect the financial status of the enterprise are finally selected, and the Z-score is calculated to measure the credit, risks, and limits of an enterprise. The specific formula is as follows:

$$Z=0.71X\_1+0.847X\_2+3.1X\_3+0.42X\_4+0.998X\_5 \quad (1)$$

Where X1=Working Capital/Total Assets ratio; X2=Retained Earnings/Total Assets ratio; X3=Earnings Before Interest and Tax/Total Assets ratio; X4=Market Value of Equity/Total Liabilities ratio; X5=Total Sales/Total Assets ratio.

$$X6=g1\times Net\ assets\ growth\ rate+g2\times Sales\ revenue\ growth\ rate+g3\times Total\ wage\ growth\ rate \quad (2)$$

When we combine formulas (1) and (2), the model for evaluating the credit risk of SMEs is:

$$CR= \sum_{i=1}^{6} a_i X_i \quad (3)$$

(2) Supervision system. A sound supervisory system is conducive to the soundness of corporate financial systems and changes the status quo of untrue information disclosure. Enterprise supervision

system mainly includes internal supervision system and external supervision system. Among them, a sound internal supervision system is generally composed of the board of supervisors, audit committees, and internal audit departments. The checks and balances between departments can improve the transparency of corporate financial information and the level of operation and management. The audit report issued by an internal audit can modify the calculation results of credit risk. The external supervision system mainly includes audit opinions issued by external audit institutions, the SME credit information system, and a multi-sectoral information sharing platform based on SME taxation and loan information. Generally speaking, external audit opinions have a greater contribution to reducing the impact of risks in financial evaluations.

III. Model construction. The construction of the SME financing information screening model is guided by the idea of fuzzy comprehensive evaluation and combined with the various elements that affect the information screening. Combining formula (3), the constructed model is:

$$Y = (b_i B + c_i C) \sum_{i=1}^{6} a_i X_i + d_1 M_i + d_2 M_j \qquad (4)$$

B is an internal audit opinion and B $\in$ [0, 1], and C is an external audit opinion and C $\in$ [0, 1]. The value is 1 when the internal or external audit issues an unqualified opinion, and the value is 0 when the internal or external audit issues a negative opinion. Mi is the credit rating system for SMEs, and Mj is the rating for the

multisectoral information sharing system. bi, ci, d1, d2 are weights, and Max {bi+ci, 1}=1.

In the evaluation of the information quality index Y of SME financing, it is firstly based on the financial information disclosed by the enterprise independently, and the relevant financial indicators are used for preliminary screening (Xi). Secondly, through risk identification (Mi) on the rationality and safety of the internal and external supervisory system of the enterprise, the result is an amendment to the preliminary screening. Finally, other financing-related information is used to supplement the quality of corporate information (Mj).

Case Analysis and Discussion

Through field inspections, research studies, and surveys of SMEs in Laos, this article selected a local company as a representative of SMEs. The data were based on the annual financial report data (2016-2018) provided by the company, combined with industry characteristics and research results. Also, the author asked experts to score Legal empowerment, using the constructed information screening model to analyze the company's information quality index from preliminary screening, possible risk screening, and other supplementary information screening.

This company has been engaged in the supply of building materials and the construction of bridges and roads since its establishment. Since 2013, the company has regarded hydropower development projects as an important business. The company has

successively carried out many hydropower station construction projects, where they have played a certain role in promoting the stable development of the urban and rural economy in Laos. In 2014, the company began to expand its business scope to include real estate, agriculture, and tourism. Among them, the real estate industry involves the rental of hotels and apartments, and the agriculture industry involves the export of industrial products of grains and herbal medicines. Since the beginning of 2018, this company has proposed to the government to develop agricultural projects, including vegetables, herbal medicines, and other industries, for supplying domestic demand and exporting to overseas markets.

According to the financial information disclosed by the company, combined with

the model, relevant financial indicators and non-financial indicators can be calculated as shown in Table 3 below:

Table 3: Calculation results of related indicators (X_1-X_6) of the company

Indicator	2016	2017	2018
X_1	0.5999	0.602	0.582
X_2	0.0062	0.0205	0.0283
X_3	0.0082	0.0264	0.0037
X_4	0.0061	0.0201	0.0283
X_5	0.0672	0.1291	0.1685
X_6	-	1.7145	0.4175

that the total equity in the financing structure accounts for a very small proportion, and most of the capital is obtained through debt financing, which has strong debt financing. At the same time, the company's asset turnover capacity is relatively strong, but the ability to use assets to obtain profits is weak, and the use of total assets is not efficient. From the non-financial index (X6), the calculation result of the company's growth capacity showed that the company has a certain potential for development, especially the rapid growth of the company's sales revenue in 2017. Although the expenses during the period have also increased significantly, its final operating profit and net profit have a certain degree. The increase in the rate has a good growth momentum, and the growth ability indicators are relatively ideal.

II. Possible risk screening. In terms of internal control, the company has a complete organizational structure and has set up an internal audit position to supervise investment projects and operation management. It is susceptible to the subjective factors of the chairman and lacks a certain degree of independence. According to the relevant research results, the non-listed company has not yet seen any obvious negative information about its governance structure and regulatory system.

In general, the Lao government does not mandate an ex ternal third-party audit for non-listed SMEs. During the investigation process, there was no relevant audit opinion issued by the relevant

accounting firm for the company, so its C value equals 0. Due to the lagging development of the Lao financial market, the credit investigation system and information sharing platform for SMEs is not yet complete. The Lao government has established a joint committee of industry and commerce, the Ministry of Industry and Commerce, the Ministry of Planning and Investment, and other institutions to provide relevant consulting services and financing suggestions for SMEs. Experts commented that the company has no negative information on its reputation, so $M_i=1$ and $M_j=1$. Taking into account the above factors, the information quality index of the company in 2017 and 2018 can be calculated as:

$CR_{2017}=0.71×0.602+0.847×0.0205+3.1×0.0264+0.42×0.0201+0.998×0.1291+0.5×1.7145= 1.5212$

$Y_{2017}= 0.35×O.75×1.5212+0.56×1+0.21×1=1.1693$

$CR_{2018}=0.71×0.582+0.847×0.0283+3.1×0.0037+0.42×0.0283+0.998×0.1685+0.5×0.4175= 0.8375$

$Y_{2018}= 0.35×O.75×0.8375+0.56×1+0.21×1=0.9898$

It can be concluded that the information quality index of this company in 2017 is higher than that of the company in 2018, which is basically consistent with the company's actual industry reputation and financing ability, mainly due to the company's participation in construction as the main contractor in 2017 and operates a hydropower project. Through this model, the information quality index can be determined objectively, which also reflects the wide applicability of this model.

Conclusions

The analysis of the SMEs above shows that the constructed information screening model for small and medium-sized enterprises has a certain degree of operability. In the selection of indicators, the combination of financial indicators and non-financial indicators makes the data foundation more reasonable. Meanwhile, the initial credit risk is corrected by adding risk screening and other supplementary information screening in the model to make the entire model more complete. However, due to the limitation of data acquisition of Lao small and medium-sized enterprises and other factors, this article only selects one company for analysis, and in-depth research is needed to obtain more detailed information to expand the scope of application.

Research Recommendations

The improvement of the financing environment for SMEs in Laos requires the cooperation of the government, social organizations, and the capital market. There are certain differences in the financing capabilities of SMEs at different stages of development and their demands for financing. Therefore, it is necessary to design targeted financing schemes suitable for different stages of development. At the government level, a sound legal support system and development environment are important guarantees for realizing the sustainable development of SMEs. On the one hand, it is neces

sary to improve the existing legislative system, clarify the responsibilities of government administrative agencies, regulate government and market behavior, clarify the legal status of SMEs, and create a level playing field for them. On the other hand, the implementation of targeted special policies for all aspects of the development of SMEs is needed. For example, in the existing banking system, the government stipulates the proportion of loans issued to small and medium enterprises, thereby promoting the quality and strength of financial institutions' services for the majority of small and medium enterprises. Due to the high demands for financing guarantees for SMEs in the early stage of entrepreneurship, a supporting credit guarantee mechanism and risk compensation mechanism for small and medium-sized enterprises are needed. Therefore, the development of social intermediary organizations and a loan guarantee system play an important role in increasing support for SMEs. The government should build multi-level and multiple forms of credit guarantee organizations, and guide those companies to operate by the laws of the market economy, to promote the effective integration of bank credit with the capital needs of small and medium-sized enterprises and foreign investment enterprises, and strengthen financial institutions' confidence in SMEs, which will eventually improve their willingness to lend.

Bibliography

Akerlof, G. (1970). The Market For Lemons: Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Econom*

ics, 84(3), 488-500. DOI: 10.2307/1879431.

Xingxing, C. & Changzheng, H. (2012). The signal transmission and
        information screening model of commercial banks' loans
        to small and micro enterprises[J]. *Economic Research*

Guide, (19), 55-57.SMEs[J]. *Financia*l *Research*, (10), 115-132.

Rothschild, M. & Stiglitz, J. (1976). Equilibrium in Competitive
        Insurance Markets: An Essay On The Economics of Imper
        fect Information. *The Quarterly Journal of Economics,*
        90(4),630-49. DOI: 10.2307/1885326.

Spence, A. (1978). Product Differentiation and Performance in In
        surance Markets. *Journal of Public Economics*, 10(3), 427-
        447. DOI: 10.1016/0047-2727(78)90055-5.

Stiglitz, J. (1975). The Theory of "Screening," Education, and the
        Distribution of Income. *American Economic Review***,** 65(3),
        283-300.

Xiuzhen, W., Huiping, D. & Yi, H. (2017). Evaluation of my country's
        SMEs' Financing Efficiency Based on DEA Method[J]. System
        Engineering Theory and Practice, 37(004), 865-874.

Miao, X. & Xinglin, D. (2020). the Risk Evaluation of Intellectual
        Property Pledge Financing of Small and Medium-sized
        Technology Enterprises——Based on the Perspective of
        Supply Chain Finance[J]. *Science and Technology Manage*
        ment Research, 40(18), 203-209.

Yuan Mu. (2013). Review of research on credit rationing theory and
    relational financing theory [J]. *Economic Research Guide,*
    000(027), 138-139.

Mu, Z. & Xinpu, W. (2019). Risk Evaluation of Intellectual Property
    Pledge Financing of Big Data Enterprises[J]. *Science and
    Technology Management Research*, (21),61-66.

Shijia, Z. (2011). Information Screening and Its Application——The
    Behavior of Information Inferior Party under the Condition
    of Prior Asymmetric Information[J]. *Times Finance*,
    (7),229-230.

Xiongzhi, Z. (2018). The status quo, risks, and path selection of
    private financing of small and medium-sized enterprises[J].
    Enterprise Economics, (5), 188-192.