ANALYSIS OF SUPPLY CHAIN FINANCE RISK ASSESSMENT BASED ON NUMERICAL ANALYSIS ALGORITHM

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ABSTRACT

To promote the coordination and stability of supply chain finance and improve the financing environment of small and medium-sized enterprises, this paper designs a supply chain finance risk assessment and analysis platform. Combining the characteristics of a large amount of risk assessment data, a numerical analysis algorithm is introduced in the process of platform design, and the extrapolation method in the numerical analysis algorithm is used to calculate the risk assessment-related data. To make the calculation faster and the data more accurate, the central difference quotient extrapolation is used to accelerate and a downtime mechanism is introduced. Firstly, the approximation formula for the calculation is constructed, followed by the construction of a sequence of variable steps to obtain a sequence of approximations. Finally, the obtained approximate sequence values are used to construct an interpolating polynomial, and the constant term of the polynomial, which is the final risk factor, is obtained through continuous iteration. To verify the effectiveness of the numerical analysis-based algorithm in supply chain financial risk assessment, the simulation results show that the risk assessment accuracy of the numerical analysis-based supply chain financial risk assessment platform is as high as 99% and the time required is 17 seconds higher than other assessment models, which verifies that the numerical analysis algorithm can improve the accuracy and rapidity of risk assessment.

KEYWORDS

Numerical analysis, extrapolation, iteration, supply chain finance, risk assessment

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1. INTRODUCTION

In recent years, supply chain finance has gradually received wide attention from society, and as an innovative financial product, it has played a positive role in promoting the coordination and stability of the supply chain and solving the financing problems of SMEs [1-2]. However, as an innovative financial product, it has attracted close attention from all walks of life, including financial institutions and supply chain enterprise clusters, once it was proposed [3]. The orderly development of supply chain finance has promoted the coordination and stability of the supply chain, improved the financing environment of SMEs, and enhanced the operation quality of the financial system. However, China's supply chain finance is late and immature, and although some experience and achievements have been made in the assessment of credit risk in supply chain finance, it still needs continuous in-depth research and improvement.

The literature [4] studies the credit risk of SME financing from the perspective of supply chain finance. The supply chain finance system is constructed through blockchain technology, which integrates supply chain finance information into blocks. The literature [5] constructed a web-based search and matching platform through the EEnvest tool based on the analysis of the correlation between technology and financial risks, and their originating factors or root causes. This platform contains a large number of already defined key performance indicators necessary to assess investment risk, and the presence or absence of risk is known by searching and matching. An improved approach to credit risk assessment is proposed in the literature [6]. Based on credit data from the China Banking Regulatory Commission, the paper constructs a multidimensional and multilevel credit risk indicator system. In particular, it proposes an improved sequential minimum optimization learning algorithm for the credit risk classification model, named four variables. In each iteration, it jointly selects four variables into the working set and proposes a theorem to guarantee the analytical solution of the subproblem. It is evaluated on the Chinese credit dataset and two benchmark credit datasets. The experimental results show that the four variables are competitive in saving computational cost and outperform the other five advanced classification methods in terms of the accuracy of credit risk assessment. The literature [7] proposes a revised method for high-dimensional dynamic variance, and covariance matrix estimation through risk factor mapping. To validate the effectiveness of the method for risk assessment, a covariate multivariate generalized autoregressive conditional heteroskedasticity model is used to model the risk factors flexibly, and a Bayesian approach is used to estimate the unknown parameters and various risk measures. The results show that the method is able to obtain dependent estimates of asset returns in large portfolios with high computational efficiency. Although the above literature proposes a relatively feasible system and recommendations for supply chain finance risk assessment, it ignores the transfer mechanism of market risk and relies highly on credit ratings, resulting in a low precision of the assessed values.

Therefore, this paper constructs a supply chain finance risk assessment platform based on a numerical analysis algorithm. The numerical indicators of risk assessment

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are calculated with the help of the extrapolation method in the numerical analysis algorithm. To make the extrapolation faster, the central difference quotient is used to accelerate the extrapolation. By constructing an approximate formula for the risk factor function and continuously changing the step size, an approximate sequence of values of the risk factor function is obtained, and the obtained approximate sequence of values is used to construct an interpolating polynomial, to obtain the constant value in the polynomial, i.e., the final risk factor. Considering that the basic idea of numerical analysis is iterative, it is also necessary to introduce stopping in the process of iteration to remember. A sufficiently small value is determined beforehand, and if a number smaller than the determined value is obtained in the iterative calculation, the calculation is stopped. If the difference between the two values obtained is sufficiently small, the final risk factor can be determined, otherwise, the iterative operation is repeated. To verify the effectiveness of the proposed platform, the accuracy and time required for risk assessment of the proposed platform are analyzed in simulation experiments, and the relevant data show that the risk assessment analysis can be achieved accurately and quickly based on numerical analysis.

2. SUPPLY CHAIN FINANCE AND ITS RISK ASSESSMENT

2.1. SUPPLY CHAIN FINANCE

Supply chain finance is an innovative model of providing services to supporting enterprises upstream and downstream around the core of the supply chain using scientific management methods. The essence of supply chain finance is the logistics, capital flow, data flow and other services led by the transaction behavior, which mainly provides innovative financial services for SMEs with financing difficulties. Therefore, supply chain finance can be regarded as both a tool for financial financing using the assets in the industrial chain and a comprehensive financial product specifically serving upstream and downstream enterprises in the trade chain [8-9]. However, the early supply chain finance model was mainly applied in the management of customized customer needs and market transaction cost control, and also in the work of logistics and information flow services for a long time.

China points out in the concept study of supply chain finance that supply chain finance is a new financing method for the development of small and medium-sized enterprises, introducing various market enterprise institutions such as core enterprises and commercial banking institutions in the chain, and providing financial support for the business development of enterprises according to the cost situation in the process of supply chain production system. However, there is not an absolute unified standard for supply chain finance business in the current international academic research. However, it is recognized that a supply chain finance business should have the following characteristics: firstly, it needs to have real trade background; secondly, it

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needs credit from core enterprises; thirdly, it solves financing problems and reduces costs.

As an innovative service industry born in the financial field, supply chain finance is growing rapidly in China and has become an important tool for core supply chain organizations to enhance their competitiveness and broaden their development channels, while it has also started to become an effective channel for financing SMEs [10-11]. Supply chain finance can close the assets or physical property rights that are not highly liquid in the trade chain through financial means to realize the smooth operation of enterprise capital flow. Binding the relatively stable business performance of core enterprises is the key to the operation of supply chain finance, thus making the uncontrollable risks of financing enterprises into controllable risks in the supply chain, and the core enterprises and upstream and downstream trading enterprises form a community to implement financial services for real-time tracking of enterprise operations. The supply chain finance model is shown in Figure 1.

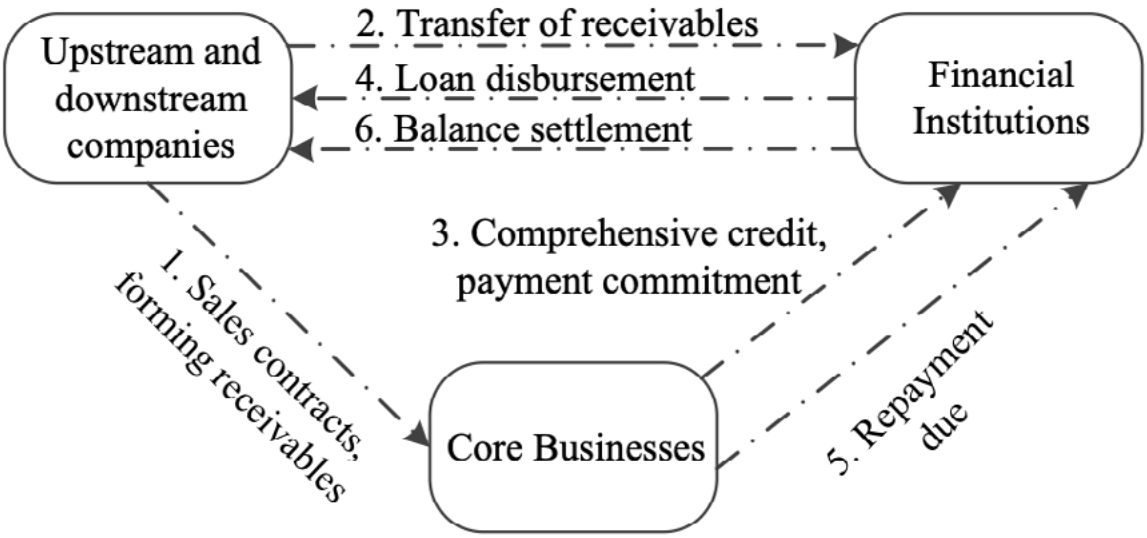

Figure 1. Supply Chain Finance Model

From Figure 1, it can be seen that the core of supply chain finance lies in the integration of different organizational forms such as suppliers, manufacturers, distributors and retailers in the supply chain with the core enterprise as the center, and providing financing and credit guarantee for enterprises through financial support. The introduction of supply chain finance can, on the one hand, provide financing guarantee for weak enterprises in the whole supply chain through effective injection of funds and avoid the emergence of supply chain imbalance, and on the other hand, introduce credit assessment mechanism to discipline the purchase and sales behavior of enterprises and regulate the commercial credit system, thus promoting the construction of long-term strategic synergy and enhancing the stability and competitiveness of the whole supply chain. Under the current situation, domestic financial institutions have started to combine theories and methods of supply chain finance to innovate in their respective product solutions.

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2.2. SUPPLY CHAIN FINANCE OPERATION PROCESS

Under the traditional credit model, banks analyze the credit of SMEs mainly for the financing companies themselves, but SMEs often fail to meet the banks' standards due to their own disadvantages, which limits the financing needs of SMEs. Supply chain finance, on the other hand, provides a new perspective on financing with its unique characteristics. Based on supply chain finance, bank credit requirements are not limited to SMEs themselves, but instead focus on the whole supply chain [12]. Financing is provided by the authenticity between enterprises, which can weaken the limitations caused by SMEs' own defects to a certain extent [13]. When financing, banks not only assess the borrower's credit status, but also examine the cooperative relationship between the enterprise and the core enterprise, and review it in conjunction with the authenticity of the trade background. On the basis of trade authenticity, banks provide flexible and variable financing solutions to SMEs for the assets generated in the transaction process, thus allowing more SMEs to enter the bank's service paradigm. The specific process is shown in Figure 2.

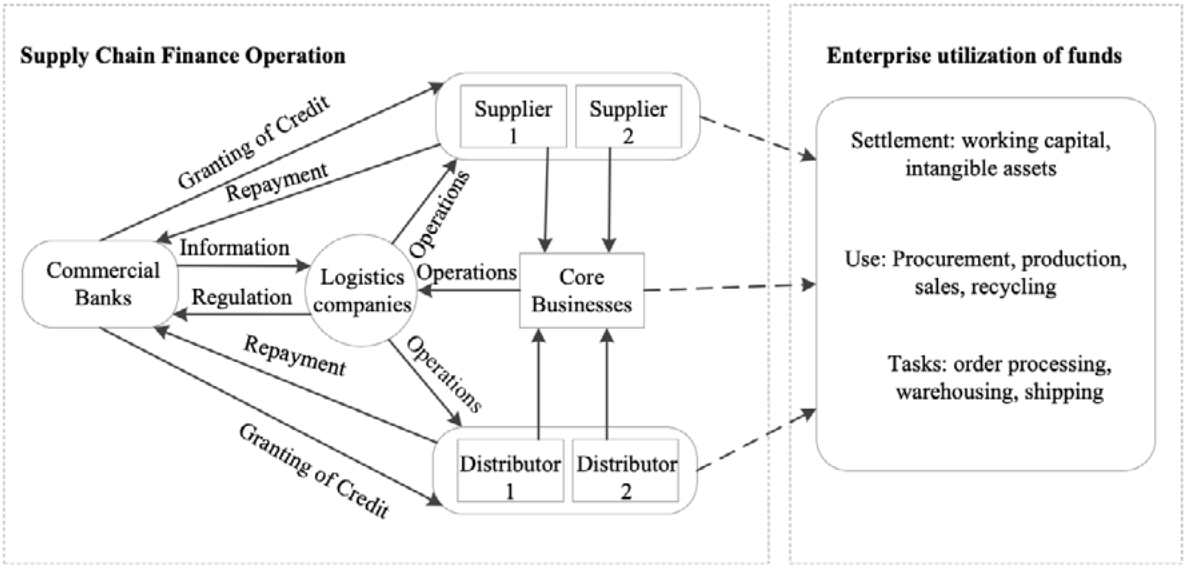

Figure 2. Supply chain operation process

As can be seen from Figure 2, supply chain finance is based on real trade background and supported by sufficient information, and the risks are effectively controlled or reduced to a certain extent. From the bank's perspective, compared with the traditional lending model, the financial strength of individual enterprises is no longer assessed separately, and the assessment system for credit access is more relaxed. In supply chain finance, banks first assess the financial status and development potential of the core enterprises. The bank provides financial services to its upstream and downstream enterprises by focusing on the quality credit of the core enterprise, which, as the main body of bank credit, ties its own credit with SMEs, and then evaluates SMEs not only considering their financial situation but also paying more attention to their cooperation with the core enterprise. Finally, supply chain

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finance also emphasizes the self-repayment of credit repayment sources, i.e., directing the sales revenue to repay the credit.

Relative to the core enterprises, supply chain finance can effectively solve the dilemma of difficult financing for its upstream and downstream enterprises, promote the stable cooperative relationship between each SME in the supply chain and the core enterprises, and ensure that the core enterprises have stable suppliers and sellers. Once the development of SMEs at each node of the chain is restricted, it will affect the supply and sales of the core enterprises. However, through supply chain financial services, the cooperative relationship between each enterprise in the supply chain can be consolidated, which in turn is conducive to the development and growth of the core enterprises themselves. The smooth flow of funds and reduced payment pressure of core enterprises also expand their own production and sales, thus driving the healthy development of the whole supply chain.

It can be seen that the financing model of supply chain finance can relax the financial analysis and access principle of banks to individual enterprises because supply chain finance is actually oriented to a collection of enterprises with business relations, and there exists a certain relationship bond within this collection itself, namely the existence of horizontal supervision mechanism. The existence of such horizontal supervision proves that there are still certain risks in the supply chain financing model, therefore, the risk assessment of supply chain finance becomes more and more important.

2.3. SUPPLY CHAIN FINANCE RISK ASSESSMENT

Supply chain finance risk refers to the possibility that commercial banks and third-party logistics companies may suffer losses due to the impact of various unpredictable uncertainties in the process of financing supply chain enterprises, which may cause the actual revenue of supply chain finance products to deviate from the expected revenue or the assets may not be recovered.

Therefore, banks must carry out risk assessments before helping enterprises to carry out supply chain finance financing. Therefore, the risk assessment index of supply chain finance should contain the following four aspects.

The first is the qualification of fiduciary, including profitability, solvency, operational capability and development potential. The qualification of the fiduciary is similar to the evaluation indexes of traditional business, focusing on the basic financial status and development trend of the enterprise, and the selection of indexes is mainly based on the evaluation indexes of traditional business.

The second is the core enterprise qualification. In supply chain finance, the counterparty of the SME is the core enterprise. The qualification of the core enterprise mainly includes industry status, profitability, repayment ability, etc. Because the core

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enterprise is tied to the credit of SMEs, the qualification of the core enterprise directly affects the supply chain finance business carried out by banks.

The third is the overall operation of the supply chain. The business capability of the trustee and the cooperation with the core enterprises are considered from the whole supply chain. Among them, the industry situation mainly shows the development prospect of the whole industry, and the cooperation situation examines the closeness of cooperation between SMEs and core enterprises and the authenticity of transactions.

The fourth is the condition of the assets under the financing. This is the most important thing for the bank to examine because the bank is to evaluate the value of the transaction assets, and then grant credit according to the evaluation result, if the fiduciary defaults, the transaction assets are also a guarantee for the bank to liquidate them to make up for the loss.

Combined with the main elements of risk assessment, this paper comes up with supply chain finance risk evaluation indexes, as shown in Table 1.

Table 1. Supply chain financing risk evaluation indicators

Tier 1 indicators	Secondary indicators	Tertiary indicators
SME Qualifications	Comprehensive competence	Self-qualification
Core Corporate Qualifications	Core own qualifications	Credit situation
	Industry status	Industry Impact
	Profitability	Operating profit
		Return on total assets
		Return on net assets
	Solvency	Gearing ratio
		Current ratio
		Quick ratio
		Operating cash flow ratio
		Sales cash flow ratio
	Operational capabilities	Total asset turnover ratio
		Accounts receivable turnover days
		Inventory turnover days
	Development potential	Operating income growth rate
		Net margin growth rate
Supply Chain Situation	Overall operation	Closeness of cooperation
Assets under financing	Physical characteristics	Trusted Bad Debt Rate

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As can be seen in Table 1, banks in the traditional credit business mainly examine the borrowers themselves, focusing on financial characteristics, industry status, and business situation. Each SME in the supply chain does business with its financing bank according to its situation, and banks individually assess only SMEs, so the credit access assessment of each SME is also relatively independent. As the efficiency of the supply chain increases, supply chain finance is developing rapidly, and banks have to provide financing for SMEs in need based on the whole supply chain. The credit evaluation of SMEs by banks in supply chain finance should be based on comprehensive analysis.

The description and assessment of the risks inherent in highly diversified investments in financial markets are often based on complex mathematical and computational models. Solving these models precisely in closed form, even at the level of a single instrument, is usually impossible, and therefore efficient numerical algorithms must be found. Accordingly, this paper introduces numerical analysis algorithms in supply chain finance risk assessment, seeking to provide a deeper grasp of risk.

2.4. APPLICATION OF NUMERICAL ANALYSIS ALGORITHMS IN RISK ASSESSMENT

2.4.1. NUMERICAL ANALYSIS

Numerical analysis is the study and analysis of numerical computational methods and their theory for solving mathematical computational problems by computer, and it is an important branch of mathematics [14]. Numerical analysis takes the theory and methods of solving mathematical problems by digital computers as the object of study and is the main part of computational mathematics. The main contents include interpolation, function approximation, curve fitting, numerical integration and numerical differentiation. Simply put, numerical analysis is the science of studying algorithms for continuous problems. The most important concepts in it are algorithms and continuous problems [15]. First, continuous problems are complex model problems abstracted from physics or other disciplines, generally infinite-dimensional problems and almost impossible to find analytical solutions. These intractable continuous problems are naturally the target of numerical analysis. Second, the design and analysis of algorithms for solving continuous problems are the core of numerical analysis. Their purpose is to discretize a continuous infinite-dimensional problem to obtain a discrete finite-dimensional solvable problem and then to obtain an approximate solution. Currently, numerical analysis is commonly used by hedge funds to calculate the market value of stocks and their variability using various numerical analysis tools and by insurance companies to perform actuarial analysis using numerical software.

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The purpose of numerical analysis is to design and analyze some calculations in such a way that approximate but sufficiently accurate results can be obtained for some problems. The numerical analysis mainly considers the numerical solution of a problem, including but not limited to the construction of numerical algorithms, the effect of error propagation, the estimation of computational complexity, and the implementation of efficient and reliable computers. Although there are different numerical models to construct for different problems, they generally have some commonalities:

1. Numerical analysis will generally use linear algebra, advanced mathematics, real analysis, and generalized functional analysis as the basis or analytical tools.

2. If a problem cannot be solved directly, try to consider an approximate solvable problem.

3. Have a certain degree of stability. Stability here refers to the sensitivity of the solution of the model problem to the initial data. That is, the numerical solution changes due to small changes in the initial data, and the smaller the change, the more stable it is.

2.4.2. NUMERICAL ANALYSIS OF EXTRAPOLATION METHOD TO SOLVE

Numerical analysis is divided into different areas depending on the problem to be solved. Among them, extrapolation is commonly used in economic calculations and forecasting.

Extrapolation is a general term for a class of methods that extrapolate the future based on past and present trends, and is used for forecasting scientific, technological, economic and social development, and is an important part of the intelligence research method system. In layman's terms, it is a good method of approximation calculation, for the low-precision approximation that has been obtained, just make a few times the simplest four operations, then immediately get a high-precision approximation. More simply, it is a method to process the low-precision approximation to a high-precision approximation, referred to as finishing.

Let the function be a continuous and differentiable real function in the supply chain finance calculation process. Numerical analysis is the direct use of the procedure for calculating the function to calculate the derivative value of the function at a certain place, which in turn leads to data related to risk assessment. To make the results more accurate, this paper uses a variable step method to improve the accuracy of the calculation. When the value of the step size is sufficiently small, the first-order difference quotient of the function at a fixed point can be used as an approximation to the risk assessment function, resulting in an approximate formula related to the step size. Next, a sequence of step lengths that converge monotonically to zero is

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constructed for calculation. Letting the given initial step size be greater than zero, a step series can be simply obtained, and accordingly, a sequence of approximations to the derivatives is obtained.

The basic idea of numerical analysis is iteration, so it is certainly an easy task to calculate a sequence using a loop structure, but a stopping rule needs to be determined. In this case, the decision to stop can be based on the actual accuracy required. Determine in advance a function value on a sufficiently small positive number, as long as the iterative process of computing a value less than this positive number, the system will automatically stop the calculation.

To obtain the risk assessment data quickly, the central difference quotient extrapolation acceleration can be used. The basic idea of the central difference quotient extrapolation acceleration is exactly the same as the extrapolation method, which also uses a three-step strategy:

1. Construct the approximation formula for the computational function.

2. Construct the sequence of variable steps so as to obtain the sequence of approximate values of the function.

3. Construct the interpolation polynomial using the obtained approximate sequence values, thus obtaining the constant term of the polynomial.

Since the central difference has an accuracy of order 2, the sequence here will converge a little faster and the final results that can be obtained will be more accurate [16]. This shows that it is practical to apply numerical analysis algorithms to supply chain finance risk assessment.

2.5. SUPPLY CHAIN FINANCE RISK ASSESSMENT PLATFORM

Applying numerical analysis to supply chain financial risk assessment analysis can improve the performance related to risk assessment, such as accuracy and rapidity. Accordingly, this paper constructs a supply chain financial risk assessment platform based on numerical analysis algorithms, as shown in Figure 3.

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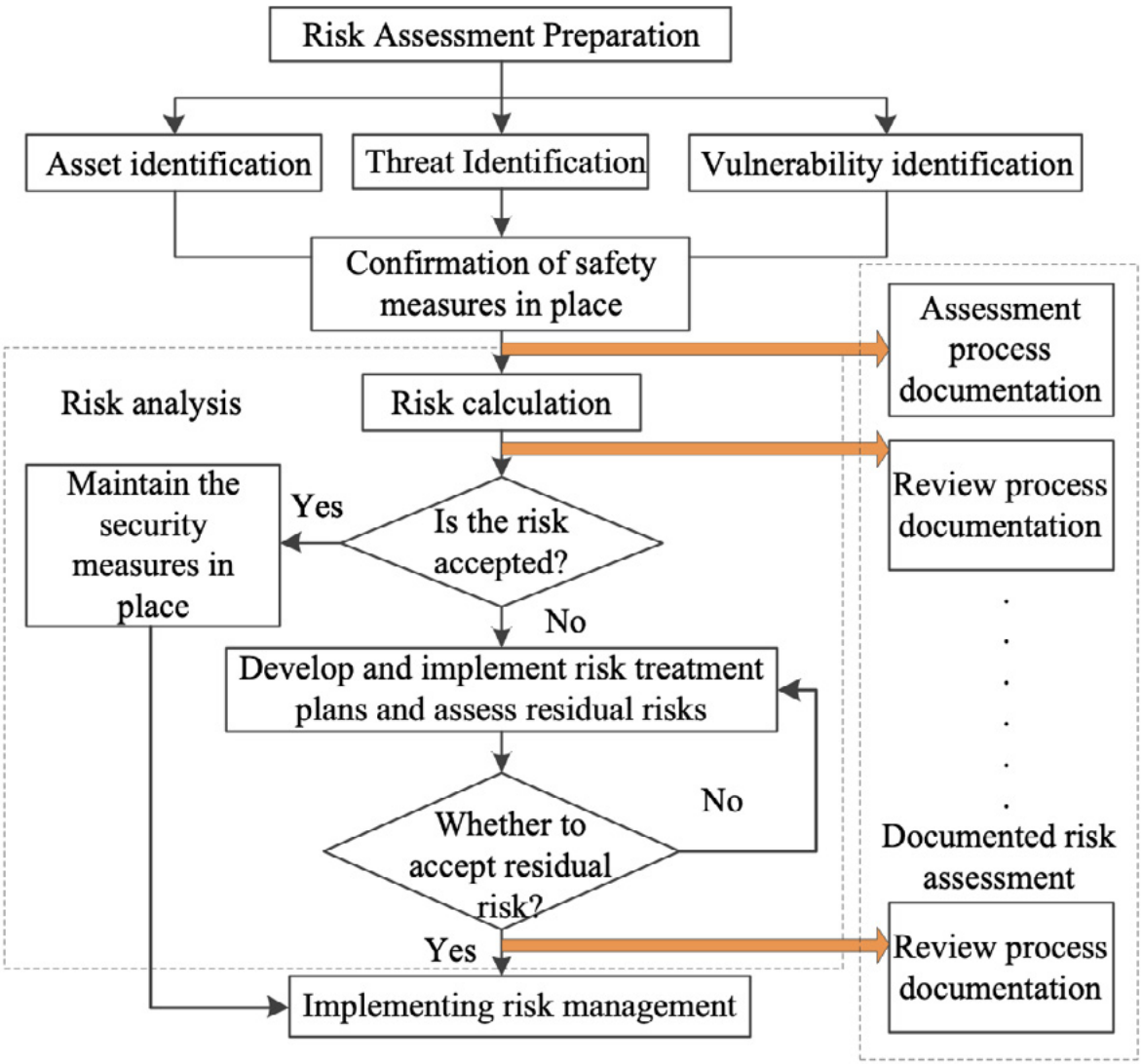

Figure 3. Supply chain finance risk assessment platform based on numerical analysis

As can be seen in Figure 3, the supply chain finance risk assessment and analysis platform built based on numerical analysis algorithms in this paper forms a set of integrated regulatory data control systems based on ex-ante and ex-post. The platform adopts the concept of a middle platform, facing the core enterprises, with custom data processing, data governance and control, data asset management, data replenishment, data reporting, risk management and monitoring capabilities, which can be well applied to major financial institutions and data empowerment for business users in the field of risk assessment. At the same time, the platform continuously carries out iterative data computing in the process of risk assessment, realizing all-around monitoring of risks and effectively preventing financial risks caused by residual risks.

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3. ANALYSIS OF THE EFFECT OF THE SUPPLY CHAIN FINANCE RISK ASSESSMENT PLATFORM

3.1. HIGH ACCURACY OF RISK ASSESSMENT

The main purpose of applying numerical analysis algorithms to supply chain financial risk assessment is to help banks and other related financial institutions accurately identify the possible financial risks of enterprises. To verify that numerical analysis can help the supply chain financial risk assessment platform to improve the accuracy of risk assessment, this paper randomly selects 10 enterprises in a city and combines the risk assessment indexes derived above to derive 180 financial risk factors. Using the numerical analysis algorithm constructed in this paper, the accuracy of the risk assessment was obtained by using the supply chain financial risk assessment platform and the traditional risk assessment model. The results obtained under the same conditions are shown in Figure 4.

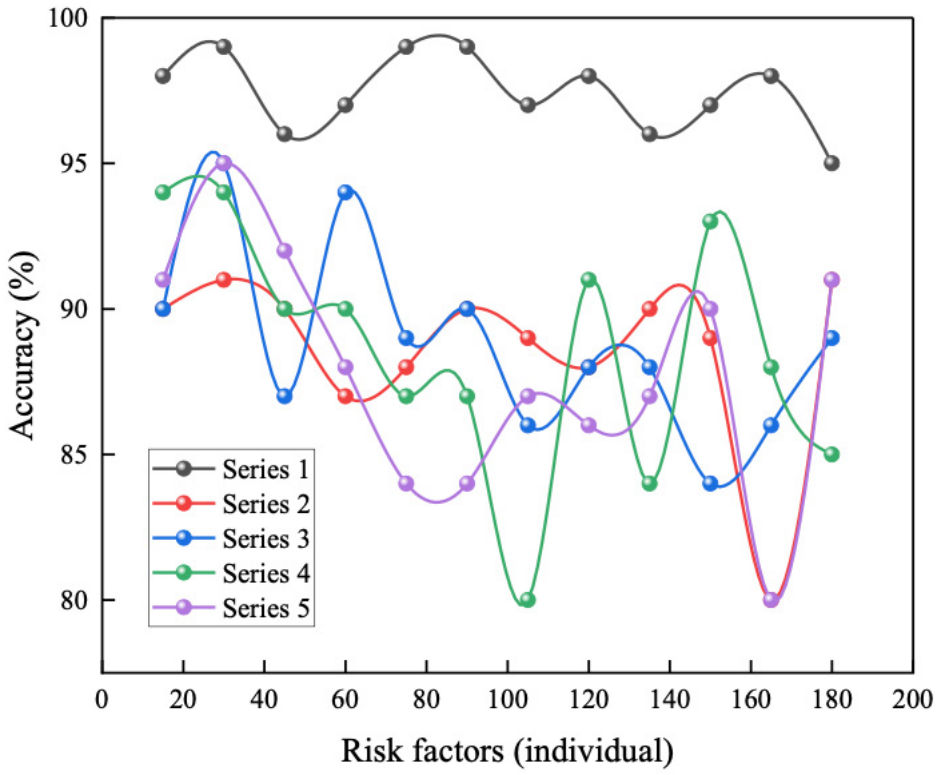

Figure 4. Accuracy of risk assessment under different platform models

As can be seen from Figure 4, the risk assessment accuracy of the supply chain finance risk assessment platform based on numerical analysis is consistently higher than that of the other four traditional risk assessment models. When the risk factors are 45 or less, the risk assessment accuracy of the supply chain finance risk assessment platform based on numerical analysis is always 96% and above, and can reach 99% at the highest. The risk assessment accuracy of the other four risk assessment models can only reach 95% at the highest. In particular, the risk

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assessment accuracy of the Credit Risk model is 87% when the number of risk factors is 45, which is 9% lower than that of the model proposed in this paper. When the number of risk factors is 60, the risk assessment accuracy of the supply chain finance risk platform based on numerical analysis is 97%, which is higher than the other four models by 10%, 3%, 7% and 9%, respectively. When the number of risk factors is 90, the accuracy rate of the risk assessment of the supply chain finance platform based on numerical analysis reaches its peak again, 99%. In contrast, the risk assessment accuracy of the logistic regression model reached its historical low of 84%, with a difference of 15% between the two.

With the increase of data, the risk assessment accuracy of the supply chain finance risk assessment platform based on numerical analysis always maintains a high level of more than 90%. In contrast, the risk assessment accuracy of the other four risk assessment models can only be maintained above 80%. When the number of risk factors reaches 165, the accuracy of risk assessment of the platform built in this paper is 98%, while the accuracy of risk assessment of the other four platforms is 88% at the highest and 80% at the lowest, which is 10% and 18% different from the platform built in this paper respectively. When the number of risk factors reaches 180, the risk assessment accuracy of the supply chain finance risk assessment platform based on numerical analysis is still the highest among the five platforms, which is higher than the other four models by 4%, 6%, 10% and 4%, respectively. The difference in accuracy rates is small in terms of percentage, but when converted to the number of specific risk factors through calculation, the difference is large.

It can be seen that after the introduction of a numerical analysis algorithm in the risk assessment analysis of supply chain finance, the accuracy rate of risk assessment is always maintained at a high level, which can help banks identify the risks of enterprises in time and reduce the risk of investment.

3.2. SPEEDY RISK ASSESSMENT

The development of supply chain finance affects not only a large number of SMEs and banks but also the employees in the companies. If the financial help related to supply chain finance is not timely, it is likely to cause an economic crisis in a series of enterprises, which will affect livelihood issues. Therefore, the risk assessment of supply chain finance must be guaranteed to be fast. To verify the rapidity of risk assessment of supply chain finance based on numerical analysis, this paper shows the simulation experiment again based on the relevant conditions in 3.1 to derive the speed of risk assessment of platforms and models in 5, and the results are shown in Figure 5.

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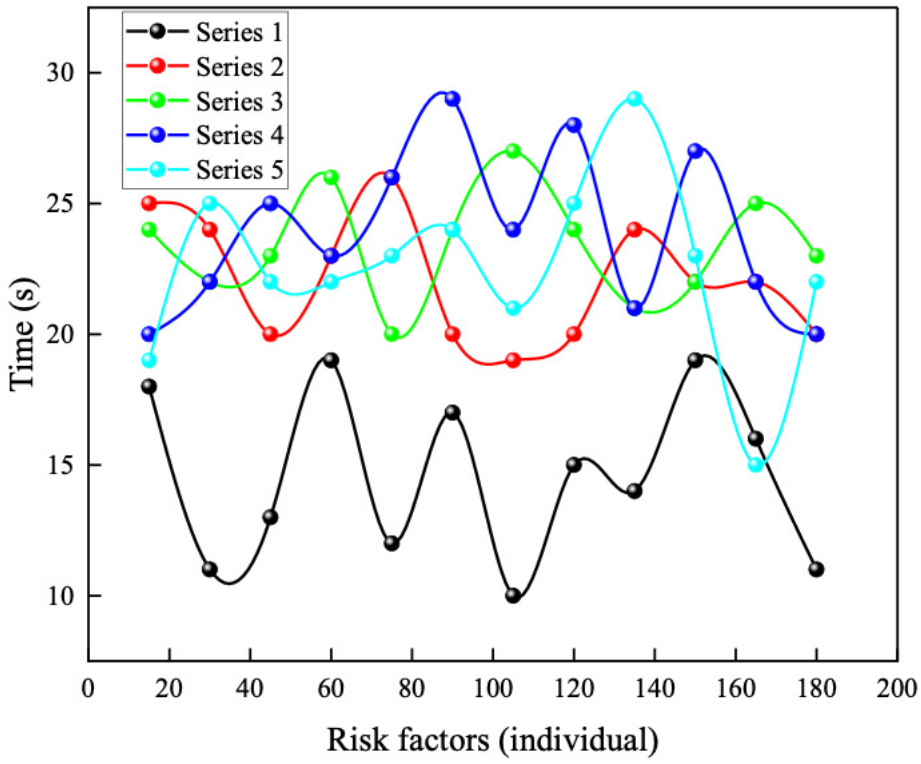

Figure 5. Time required for risk assessment under different platform models

As can be seen in Figure 5, when the number of risk factors is 15, the logistic regression model takes only 19 seconds to derive all the risk factors, which is less time. However, the supply chain finance risk assessment platform based on numerical analysis only takes 18 seconds to derive all the risk factors, which is still 1 second faster than the logistic regression model. The KMV model takes 25 seconds to calculate all the risk factors, which is 7 seconds longer than the numerical analysis-based supply chain financial risk assessment platform. When the risk factors are greater than 15 and less than 90, the platform built in this paper takes at least 11 seconds to calculate all the risk factors. The other four platforms take at least 20 seconds to derive all the risk factors, which is 9 seconds longer than the platform built in this paper. When the number of risk factors is 105, the supply chain finance risk assessment platform based on numerical analysis can derive all the risk factors in 10 seconds, which is 17 seconds less than the other risk assessment platforms. When the number of risk factors is 150, the supply chain financial risk assessment platform based on numerical analysis takes the most time, 19 seconds, but it still takes less time than the other four models. When the number of risk factors is 165, the platform built in this paper takes 16 seconds to derive all the risk factors. This is 6 seconds, 9 seconds, 6 seconds and 1 second faster than the other four models, respectively. When the number of risk factors is 180, it takes only 11 seconds to derive all the risk factors, which is twice as long as the logistic regression model.

By comparing the risk factor discovery time, it can be seen that the risk factor discovery time of the supply chain finance risk assessment platform based on

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numerical analysis is always controlled within 20 seconds, with a minimum of 10 seconds. As the risk increases, the speed of risk assessment remains at a high level. Thus, the application of numerical analysis to supply chain finance risk assessment is helpful to help banks quickly discover the risks of enterprises, and then reduce financing to enterprises to ensure the safety of capital.

4. CONCLUSION

To improve the financing environment of SMEs, this paper calculates the numerical indicators of risk assessment with the help of the extrapolation method in the numerical analysis algorithm. To make the extrapolation faster, the central difference quotient is used to accelerate the extrapolation. Firstly, an approximate formula for the risk factor function is constructed. Secondly, a sequence of variable steps is constructed to obtain an approximate sequence of risk factor functions. Finally, the obtained approximate sequence values are used to construct an interpolating polynomial, to obtain the constant term of the polynomial, i.e., the risk factor value. Combined with the above numerical analysis process, this paper constructs a supply chain finance risk assessment platform based on numerical analysis. To verify that the platform built in this paper can accurately and quickly identify the risks in supply chain finance, 180 risk factors are screened out in 10 companies, and the built platform is applied to risk assessment with other four risk assessment models, and the accuracy and speed of risk assessment of the five platform models are obtained respectively. The results show that the supply chain finance risk assessment platform based on numerical analysis has the highest risk assessment accuracy of 99% and takes at least 11 seconds to find all risk factors, while the other models take 20 seconds to find all risk factors. The accuracy and speed of supply chain finance risk assessment shows that efficient risk assessment analysis can be achieved by relying on numerical analysis algorithms.

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