

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

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**QUALIFICATION THESIS
FOR MASTER'S DEGREE**

ON THE TOPIC:

«Fiscal risks: management system in the World»

Field of knowledge: 07 "Management and Administration"

Speciality: 072 "Finance, Banking, Insurance and Stock Market"

Level of higher education: second (master's) level

Educational programme PUBLIC FINANCE

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The master's thesis was approved for defence
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Protocol № _____ from ' ____ ' _____ 2024

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Kharkiv 2024

Abstract

Thesis of master's degree.

Specialty 072 – ‘FINANCE, BANKING, INSURANCE AND STOCK MARKET’

Educational programme – ‘Public Finance’

V. N. Karazin Kharkiv National University. - Kharkiv, 2024.

This thesis explores the importance and specific practice of fiscal risk management, and conducts in-depth analysis from theory to actual cases. The article first explains the basic concepts and characteristics of fiscal risk, emphasizing the dynamic, complex and systematic nature of fiscal risk. Then, it explains the models and strategies of fiscal risk management, points out the key to combining preventive management with emergency mechanisms, and proposes strategies such as structural optimization, operational norms, and the use of financial instruments.

The study revolves around the identification, assessment, response and monitoring of fiscal risks. It integrates advanced data-driven technologies such as big data analysis and artificial intelligence to improve the accuracy of risk identification and assessment. A multidimensional approach combining qualitative and quantitative methods allows for a comprehensive risk assessment, which is essential for the development of active management strategies. The study also emphasizes the role of policy optimization, resource allocation efficiency and inter-departmental cooperation in mitigating fiscal risks.

Drawing on case studies from China, the United States and the European Union, this thesis explains different approaches to fiscal risk management. China's strategy focuses on local debt management and fiscal reform, including real-time data monitoring and transparent fiscal policies. The United States showcases its advanced fiscal risk monitoring platform, which uses technological innovation to effectively predict and manage risks. The EU has embodied cooperative fiscal governance through frameworks such as the Stability and Growth Pact, which has promoted transparency and coordinated responses among member states. Finally, the thesis analyzes the challenges faced by fiscal risk management, such as high

policy volatility, insufficient informatization, and weak coordination mechanisms, and proposes countermeasures such as policy optimization, technical support, and transparency improvement. It also recommends optimizing risk identification and assessment, improving system technology, building a policy regulatory framework, and strengthening collaborative management.

This thesis critically analyzes the challenges faced by fiscal risk management, such as policy volatility, insufficient technical infrastructure, and coordination gaps. It proposes suggestions for strengthening policy frameworks, integrating cutting-edge technologies, and promoting cross-sectoral and international cooperation..

Keywords: fiscal risk, risk management, policy optimization, data analysis, transparency, international cooperation.

CONTENTS

INTRODUCTION.....	3
Chapter 1. Overview of fiscal risk theory	8
1.1. Definition and characteristics of fiscal risk	8
1.2. Management model and strategy of fiscal risk	14
1.3. Composition of fiscal risk management system	21
Chapter 2. Implementation case of fiscal risk management system	33
2.1. Fiscal Risk Management in China	33
2.2. International fiscal risk management case.....	38
2.3. Case analysis and experience summary	46
Chapter 3. Challenges and improvements of fiscal risk management system.....	52
3.1. Main challenges in system implementation	52
3.2. Improvement strategies at policy and technical levels	60
3.3. Strategic recommendations for optimizing fiscal risk management	68
CONCLUSION	80
REFERENCES	84

INTRODUCTION

Relevance of the research. In recent years, fiscal risk management has received increasing attention. With the continuous deepening of China's reform and opening up, potential fiscal risks have gradually surfaced and become a key factor restricting economic development. This is not only related to the country's fiscal security, but also directly related to the stability of the macroeconomy and the improvement of social welfare. Therefore, how to effectively control fiscal risks has become a major issue faced by the government and academia. Fiscal risks may lead to a decline in revenue, an increase in expenditure, and an increase in deficit and debt problems, which in turn affect the financial market, shake investor confidence, and even trigger capital outflows, exacerbating economic uncertainty. In the context of globalization, international economic exchanges are frequent, and the impact of external market fluctuations on domestic finances is becoming more and more obvious. In addition, fiscal risks also pose a challenge to social equity and economic efficiency. Therefore, establishing a scientific and systematic fiscal risk management mechanism is of great significance to promoting sustainable economic development.

At present, China is in a critical stage of economic transformation, and the importance of fiscal risk management is becoming increasingly prominent. Especially in the field of local debt management, due to information asymmetry and lack of data transparency, the problem of hidden debt has not been effectively solved for a long time, and potential fiscal risks continue to accumulate. At the same time, with the adjustment of economic structure and the advancement of industrial upgrading, the growth rate of fiscal revenue has gradually slowed down, while the demand for expenditure has continued to increase, which makes fiscal risks not to be underestimated. Existing risk management methods mainly rely on traditional statistical methods and expert opinions. Although they can reveal some surface risks, it is difficult to fully capture deep-seated and hidden risk factors. For example, the information asymmetry problem and the accumulation of hidden debt faced by local

governments in debt management have not been effectively addressed for a long time, resulting in the gradual emergence of risks. These problems not only threaten fiscal stability, but also bring severe tests to the formulation and implementation of policies.

The object of research is public finance.

The subject of the study is fiscal risk management system.

The purpose of the master's thesis is to summarize the theoretical and organizational foundations of the formation and functioning of the fiscal risk management system and to develop proposals for its improvement.

To achieve the purpose of the study, the following **objectives** were identified:

- provision of definition and characteristics of fiscal risk;
- considered the composition of fiscal risk management system;
- outlined the case of implementing a fiscal risk management system in the world;
- identified main challenges in fiscal risk management system implementation;
- provided strategic recommendations for optimizing fiscal risk management.

This thesis aims to propose innovative and practical solutions through in-depth discussions on the theory and practice of fiscal risk management. The core of the study is to build a comprehensive fiscal risk management framework, covering the four key links of risk identification, assessment, response and monitoring, and propose specific optimization strategies. The thesis combines China's actual situation and refers to international advanced experience to analyze the success and failure cases of various countries in fiscal risk management, providing scientific support for the formulation of fiscal policies. The research content not only includes the definition and characteristics of fiscal risk and its possible impact on the economy and society, but also focuses on the effective combination of preventive management and emergency response mechanisms, and reveals the best practices of

fiscal risk management under different economic systems through typical case studies.

This study focuses on global fiscal risk management, especially typical countries or organizations such as China, the United States, the European Union and Japan. These regions have their own characteristics in fiscal risk management, and there are also things worth learning from and referring to each other. Through cross-regional comparative analysis, the effectiveness and limitations of fiscal risk management under different economic systems are explored, revealing their commonalities and differences, and providing a theoretical basis for optimizing management strategies.

Methods of scientific research. In order to ensure the scientificity and rigor of the research, this thesis comprehensively uses a variety of research methods, such as literature review, case analysis, empirical research and cross-national comparison. Through an in-depth review of relevant domestic and foreign literature, the current status of fiscal risk management research is comprehensively reviewed, revealing the deficiencies in existing research, especially in the integrity of the risk assessment system and the application of information technology. In addition, the thesis selects several typical cases, including the successful experience of Jiangsu Province in China in local debt management, the innovative practice of the US fiscal risk monitoring system, the implementation results of the EU Stability and Growth Pact, and Japan's exploration of the construction of a multi-level risk prevention and control mechanism. With the help of these case analyses, the study combines big data technology with econometric methods to construct a quantitative model to evaluate the impact of various risk management strategies on fiscal stability. This research method that integrates theory and empirical evidence provides strong support for improving the scientific nature of fiscal risk management.

Information base of the research. The information sources of the study are rich and diverse, covering fiscal data released by the government, statistical data from international organizations, relevant academic literature, and industry reports. In addition, the study also uses modern information technology means, such as big

data analysis and artificial intelligence algorithms, to make up for the limitations of traditional analysis methods and improve the accuracy and timeliness of risk identification. It is particularly worth mentioning that by integrating various data resources, this study has established a systematic fiscal risk assessment indicator system to ensure the comprehensiveness and credibility of the research results.

Scientific novelty of the research results submitted for defence. In terms of scientific innovation, this study is mainly reflected in the following points: First, a fiscal risk management framework integrating multi-dimensional risk assessment indicators is creatively constructed. This framework combines economics, management and information technology, and proposes new methods for risk identification, assessment and response. Secondly, for the first time, big data and artificial intelligence technologies are systematically applied to fiscal risk management, and a set of dynamic monitoring and early warning systems are summarized, which significantly improves the efficiency and accuracy of risk management.

Practical significance of the results of the qualification thesis. This study is not only innovative at the theoretical level, but also has far-reaching significance in practical applications. First, it provides relevant references for the formulation and implementation of fiscal policies, especially in the construction of local debt control, budget transparency and cross-departmental cooperation mechanisms, and proposes practical and effective strategies. Secondly, by drawing on international experience, this study provides inspiration for the improvement of the global governance framework and provides references for promoting international cooperation, enhancing information transparency and responding to global challenges. Finally, the study also emphasizes the huge potential of the technology sector in fiscal risk management, pointing out that by accelerating the digitalization of fiscal management, the level of risk warning and prevention and control can be significantly improved, thus laying a solid foundation for fiscal stability and sustained and healthy economic development.

Based on the results of the study, the conference abstract was prepared: Stetsenko Tetiana, Tianshi Gong «Prospects for improving the fiscal risk management system in China», which was accepted for publication in 2 International Scientific and Practical Conference «Scientific Exploration: Bridging Theory and Practice» (December 9-11, 2024, Berlin, Germany).

Structure of the qualification thesis. The master's thesis consists of an introduction, three chapters, conclusions, a list of 103 references on 9 pages, contains 6 figures on 3 pages and 3 tables on 2 pages. The total volume of the thesis is 92 pages. The main content of the thesis is set out on 83 pages.

This thesis is mainly composed of three parts: First, the basic theory of fiscal risk is discussed in depth, covering its definition, characteristics and management framework; then, through the analysis of fiscal risk management examples in China, the United States, Europe, Japan and other regions, the respective achievements and challenges are extracted; finally, based on modern scientific and technological progress and policy orientation, a series of strategies aimed at optimizing fiscal risk management are proposed. These strategies emphasize the construction of a diversified risk prevention and control network, strengthening the function of the early warning system, improving the coordination efficiency between different government departments, and actively introducing the application of big data and intelligent technology.

This thesis aims to seek a balance between scientificity, systematicness and practicality through the combination of theoretical analysis and actual cases, and provide valuable reference for fiscal risk management in China and even the world. The ultimate goal of the study is to provide new theoretical support and practical tools for global fiscal management practices and promote continuous progress and innovation in the field of fiscal risk management.

CHAPTER 1

OVERVIEW OF FISCAL RISK THEORY

1.1 Definition and characteristics of fiscal risk

1.1.1 Definition of Fiscal Risk

As a key concept in the public finance category, fiscal risk has been continuously enriched and expanded in connotation and extension with the progress of the economy and the deepening of fiscal management practices [1]. The definition of fiscal risk, in essence, refers to the possibility of a fiscal crisis caused by imbalance in fiscal revenue and expenditure or poor management. The key to this concept lies in uncertain losses, that is, due to the combined effect of various internal and external factors, fiscal operations deviate from the expected goals, which may have an adverse impact on the government's fiscal situation, economic development and even social stability. The sources of fiscal risk are diverse, covering multiple fields such as macroeconomics, finance, law, government, business, and nature. See Figure 1.1.1 Sources of fiscal risk.

Sources of Fiscal Risk	Macroeconomic shocks
	The financial sector
	Legal cases
	Subnational governments
	State-owned enterprises (SOEs)
	Private non-financial companies
	Natural disasters
	Public private partnerships (PPPs)

Fig. 1.1.1 Sources of fiscal risks

The formation of fiscal risk is usually closely related to the imbalance of fiscal revenue and expenditure. As far as fiscal revenue is concerned, factors such as fluctuations in economic growth, changes in tax policies, and changes in tax collection and management efficiency may all lead to instability in fiscal revenue [2]. Especially in the economic downturn, corporate efficiency declines, tax sources

decrease, and fiscal revenue growth faces great pressure. In terms of fiscal expenditure, the government often needs to increase fiscal expenditure to stimulate the economy, protect people's livelihood, and provide public services. If fiscal expenditure grows too fast and exceeds the carrying capacity of fiscal revenue, a fiscal revenue-expenditure gap will be formed, thus triggering fiscal risk.

In addition to the imbalance of fiscal revenue and expenditure, poor management is also an important factor that causes fiscal risks. In the process of fiscal management, if there is a lack of effective risk identification, assessment and response mechanisms, it may lead to the accumulation and outbreak of risks. For example, some local governments lack scientific planning and risk management when borrowing, resulting in excessive debt scale and insufficient debt repayment capacity, which in turn triggers a debt crisis [3]. Problems such as inefficient use of fiscal funds and serious waste will also weaken fiscal sustainability and increase fiscal risks [4].

Fiscal risks manifest themselves in a variety of forms, including declining fiscal revenue, increasing fiscal expenditure pressure, rising debt scale, and reduced debt repayment capacity. These risks will not only affect the government's fiscal situation, but may also have adverse consequences for economic development and social stability. For example, a decline in fiscal revenue may lead to a decline in the government's public service capabilities, thereby affecting the improvement of people's livelihood and social harmony; an increase in debt scale may increase the government's debt repayment pressure and even trigger a debt crisis, which will have an impact on financial markets and macroeconomic stability.

In order to prevent and resolve fiscal risks, the government needs to implement a series of measures [5]. It is necessary to strengthen fiscal revenue and expenditure management, ensure the stable growth of fiscal revenue and reasonable control of fiscal expenditure. This needs to be achieved through improving the tax system, improving the efficiency of tax collection and management, and optimizing the structure of fiscal expenditure. It is necessary to strengthen debt management and build a sound debt risk warning and emergency response mechanism. The

government needs to reasonably plan the scale, term and structure of debt to ensure the sustainability and repayment capacity of debt. It is necessary to strengthen debt supervision and information disclosure, improve debt transparency and reduce debt risks [6].

The government also needs to promote the construction of a fiscal risk management system. This includes establishing a complete risk identification, assessment and response mechanism to improve the scientific nature and foresight of fiscal management. The government needs to make full use of modern information technology, strengthen the collection, analysis and use of fiscal data, and improve the level of informatization of fiscal management. It is necessary to strengthen the training and education of fiscal management personnel to improve their risk awareness and management capabilities [7].

In the process of managing fiscal risks, it is also necessary to focus on coordination with other policies [8]. For example, monetary policy, industrial policy, social policy, etc. are all closely related to fiscal risks. The government needs to strengthen communication and coordination with relevant departments to form a policy synergy to jointly prevent and resolve fiscal risks. It is also necessary to strengthen exchanges and cooperation with the international community, learn from international advanced experience and technical means, and improve the level and ability of my country's fiscal risk management.

Fiscal risk refers to the possibility of a fiscal crisis caused by an imbalance in fiscal revenue and expenditure or poor management. In order to prevent and resolve fiscal risks, the government needs to strengthen the construction of fiscal revenue and expenditure management, debt management, and risk management systems, and focus on coordination with other policies. Through the implementation of these measures, the government's fiscal situation can be ensured to be sound and sustainable, providing a strong guarantee for economic development and social stability. It is also necessary to continue to strengthen theoretical research and practical exploration of fiscal risk management to adapt to the ever-changing economic situation and fiscal management needs [9].

1.1.2 Characteristics of fiscal risks

As a key issue in the field of public finance, understanding the characteristics of fiscal risk is of great significance for building an effective fiscal risk management system [10]. The characteristics of fiscal risk are mainly reflected in three aspects: dynamics, complexity and systemicity. These characteristics will be discussed in detail below.

The dynamic nature of fiscal risk means that it is not static, but will continue to evolve with the changes in time and environment [11]. This dynamism comes from many aspects. First, changes in the macroeconomic environment, such as economic growth rate, inflation rate, interest rate level, etc., will have an impact on fiscal risk. For example, in the stage of rapid economic growth, fiscal revenue growth is relatively fast and fiscal risk is relatively low; while in the period of economic downturn, fiscal revenue growth slows down, and may even show negative growth, and fiscal risk rises significantly. Second, policy adjustments are also an important factor that causes dynamic changes in fiscal risk [12]. In order to cope with economic cycle fluctuations, social problems or changes in the international environment, the government may adjust its tax policy, expenditure policy or debt policy, and these adjustments may have an impact on fiscal risk. Internal management factors, such as the improvement of the fiscal management system and the improvement of the quality of fiscal officials, will also have an impact on the dynamic changes of fiscal risks. Therefore, the dynamic nature of fiscal risks requires the government to pay close attention to the macroeconomic environment and policy changes, and adjust fiscal risk management strategies in a timely manner to deal with possible risks.

The complexity of fiscal risks is reflected in the diversity of its causes and the breadth of its impact. Fiscal risks are not caused by a single factor, but by the interweaving of multiple factors such as macroeconomics, policy adjustments and internal management [13]. Macroeconomic factors, such as economic growth, inflation, and international trade, will have an impact on fiscal revenue and expenditure, thereby triggering fiscal risks. Policy adjustment factors, such as

adjustments to tax policies, expenditure policies, and debt policies, may have an impact on fiscal risks. Internal management factors, such as defects in the fiscal management system and corruption of fiscal officials, may also lead to the occurrence of fiscal risks [14]. These factors are intertwined and influence each other, making the causes of fiscal risks complicated [15]. The impact of fiscal risks is also extensive. Fiscal risk not only affects the government's fiscal situation, but may also have a profound impact on economic growth, social stability, international relations, etc. Therefore, the complexity of fiscal risk requires the government to comprehensively consider various factors and formulate a comprehensive fiscal risk management strategy.

The systemic nature of fiscal risk means that its impact is wide-ranging, which may trigger a chain reaction and even lead to economic and social turmoil. As the foundation and important pillar of national governance, once the fiscal risk breaks out, it will have a profound impact on the entire economic and social system. On the one hand, fiscal risk may cause the government's fiscal situation to deteriorate, thereby affecting the government's credibility and governance capabilities. The deterioration of the government's fiscal situation may lead to the government's inability to perform its functions, such as providing public services and ensuring social welfare, thereby affecting social stability and people's well-being [16]. On the other hand, fiscal risk may also trigger financial market turmoil and economic crisis. The deterioration of the government's fiscal situation may lead to a decline in investor confidence, capital outflows, currency depreciation, etc., which in turn will have an impact on the financial market and the economy. Fiscal risk may also trigger social unrest and political crisis [17]. The deterioration of the government's fiscal situation may lead to public dissatisfaction and a crisis of trust in the government, thereby triggering social unrest and political crisis. Therefore, the systemic nature of fiscal risk requires the government to attach great importance to fiscal risk management and establish a sound risk warning and response mechanism to prevent the spread of risks and trigger chain reactions [18].

In the practice of fiscal risk management, the dynamic, complex and systematic characteristics require the government to adopt a comprehensive management strategy. The government needs to pay close attention to the macroeconomic environment and policy changes, and adjust the fiscal risk management strategy in a timely manner to deal with possible risks [19]. The government needs to comprehensively consider various factors and formulate a comprehensive fiscal risk management strategy to deal with complex fiscal risks. The government needs to establish a sound risk warning and response mechanism to prevent the spread of risks and trigger chain reactions. The implementation of these strategies requires the government to have a high degree of risk awareness and management capabilities, as well as a sound fiscal management system and an efficient fiscal management team [20].

Specifically, when dealing with the dynamic nature of fiscal risks, the government can build a fiscal risk monitoring and early warning system to monitor the impact of macroeconomic environment and policy changes on fiscal risks in real time, and issue early warning signals in a timely manner [21]. The government can also establish a flexible fiscal adjustment mechanism to adjust fiscal policies in a timely manner to deal with risks according to economic environment and policy changes [22]. When dealing with the complexity of fiscal risks, the government needs to establish a comprehensive fiscal risk management framework, comprehensively consider the impact of various factors on fiscal risks, and formulate corresponding management strategies. The government also needs to strengthen the construction of fiscal management system, improve the standardization and transparency of fiscal management, so as to reduce the probability of fiscal risk. In response to the systemic nature of fiscal risk, the government needs to establish a sound risk warning and response mechanism, including establishing a risk warning indicator system, formulating emergency plans, and strengthening cross-departmental collaboration. The establishment of these mechanisms can help the government to timely discover and respond to fiscal risks, prevent the spread of risks and trigger chain reactions.

The dynamic, complex and systematic characteristics of fiscal risks require the government to adopt a comprehensive management strategy to deal with possible risks [23]. The government needs to pay close attention to the macroeconomic environment and policy changes, comprehensively consider various factors, and establish a sound risk warning and response mechanism to improve the efficiency and effectiveness of fiscal risk management [24]. The government also needs to strengthen the construction of fiscal management system, improve the standardization and transparency of fiscal management to reduce the probability of fiscal risk. Through the implementation of these measures, the government can better respond to fiscal risk challenges and ensure the security and stability of national finances [25].

1.2 Management model and strategy of fiscal risk

1.2.1 Management Model

The management of fiscal risks is crucial to ensuring the stability and sustainability of national finances, among which the selection and implementation of management models are particularly critical. At present, fiscal risk management mainly relies on preventive management and emergency response mechanisms, which complement each other and together constitute the core framework [26], as shown in Figure 1.2.1 Core Framework for Fiscal Risk Management.

Preventive management aims to intervene in advance through risk identification and early warning mechanisms when fiscal risks have not yet appeared or are in their infancy, so as to control risks at the lowest level. This model emphasizes foresight and initiative, requiring the financial department and related institutions to have a high degree of risk awareness and be able to keenly capture signals that may lead to fiscal crises, such as abnormal fluctuations in economic indicators and potential problems in policy implementation. To this end, it is necessary to establish a complete risk identification system covering all aspects of fiscal revenue and expenditure, including tax revenue, non-tax revenue, fiscal

expenditure, debt management, etc. Modern information technology, such as big data analysis and artificial intelligence, is used to deeply mine large amounts of data to discover potential risk points.

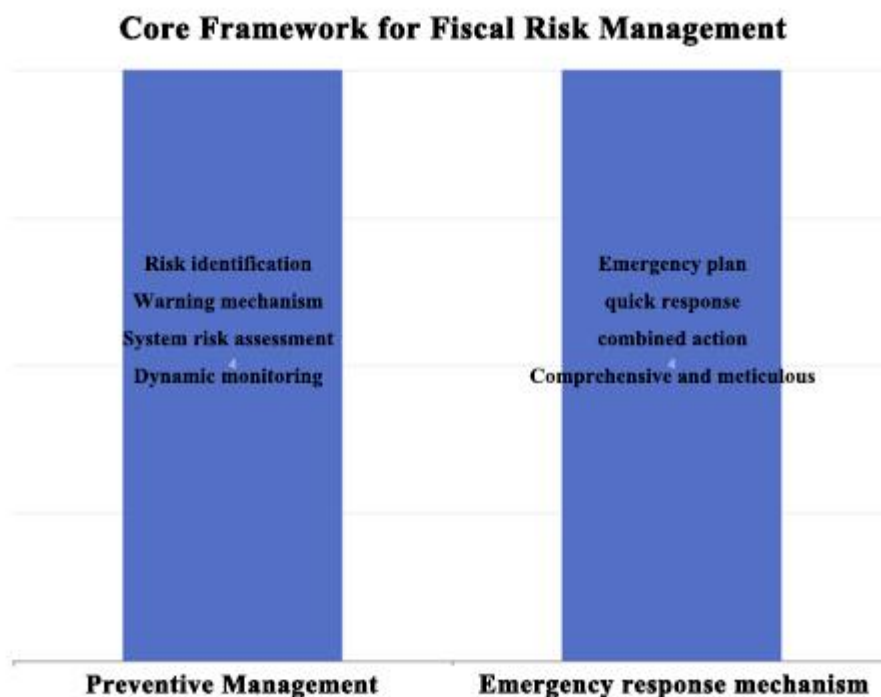


Fig. 1.2.1 Core Framework for Fiscal Risk Management

On the basis of risk identification, the establishment of an early warning mechanism is equally important. The early warning mechanism is the "eye" of preventive management, which can issue an alarm in time based on the results of risk identification and remind decision makers to take corresponding measures. The design of the early warning mechanism should be scientific and reasonable, accurately reflecting the severity of the risk and avoiding overreaction or underreaction [27]. Generally speaking, the early warning mechanism includes indicator setting, threshold determination, and alarm issuance. Indicator setting should be closely linked to the core elements of fiscal risk, such as debt ratio, deficit ratio, fiscal revenue growth rate, etc. Threshold determination needs to be considered in combination with historical data, international experience and the actual situation

of the country; alarm issuance requires timeliness and accuracy so that decision makers can respond quickly.

Corresponding to preventive management is the emergency response mechanism, which mainly initiates a series of response measures when fiscal risks have occurred or even caused certain losses. The emergency response mechanism emphasizes rapidity and effectiveness, requiring the financial department and relevant institutions to quickly organize forces, clarify the division of responsibilities, formulate and implement emergency plans after the risk occurs, so as to minimize losses. The formulation of emergency plans should be comprehensive and detailed, considering both the direct consequences of risks and the secondary disasters that may be caused; paying attention to both short-term effects and long-term effects. In the process of implementing emergency plans, it is also necessary to strengthen communication and coordination to ensure the coordinated operations among various departments and regions to form a joint force.

Preventive management and emergency response mechanisms do not exist in isolation, but complement and promote each other. Preventive management provides the premise and foundation for the emergency response mechanism. Only by doing a good job of preventive management can we reduce the occurrence of risks and reduce the cost and difficulty of emergency response [28]; while the emergency response mechanism is a strong guarantee for preventive management, which can quickly control the situation after the risk occurs and prevent the risk from spreading and worsening. Therefore, in fiscal risk management, the two should be organically combined to continuously improve management efficiency through systematic risk assessment and dynamic monitoring.

Specifically, systematic risk assessment is a bridge connecting preventive management and emergency response mechanism [29]. It requires the financial department and relevant institutions to conduct a comprehensive and in-depth assessment of fiscal risks on a regular basis to understand the current status, trends and possible impacts of risks. The assessment results should be used as an important basis for formulating and adjusting fiscal policies and improving risk management

systems. Dynamic monitoring is the key to ensuring that risk assessment results are effectively applied. Through dynamic monitoring, omissions and deviations in risk assessment can be discovered in a timely manner, so that management strategies can be adjusted in a timely manner to ensure that fiscal risks are always under control [30].

The management model of fiscal risk should adhere to the principle of combining preventive management with emergency response mechanism, and continuously improve the effectiveness of fiscal risk management by improving the risk identification system, establishing early warning mechanism, formulating emergency plan, strengthening system risk assessment and dynamic monitoring, etc. This will not only help to ensure the stability and sustainability of national finance, but also provide strong support for the healthy development of economy and society. I have created a schematic diagram for this core pattern framework, as shown in Fig. 1.2.2 Operational mechanism of the core framework for fiscal risk management. In the future, with the advancement of information technology and innovation of fiscal management, the management model of fiscal risk will continue to improve and develop, providing a more solid guarantee for the long-term stability of the country [31].

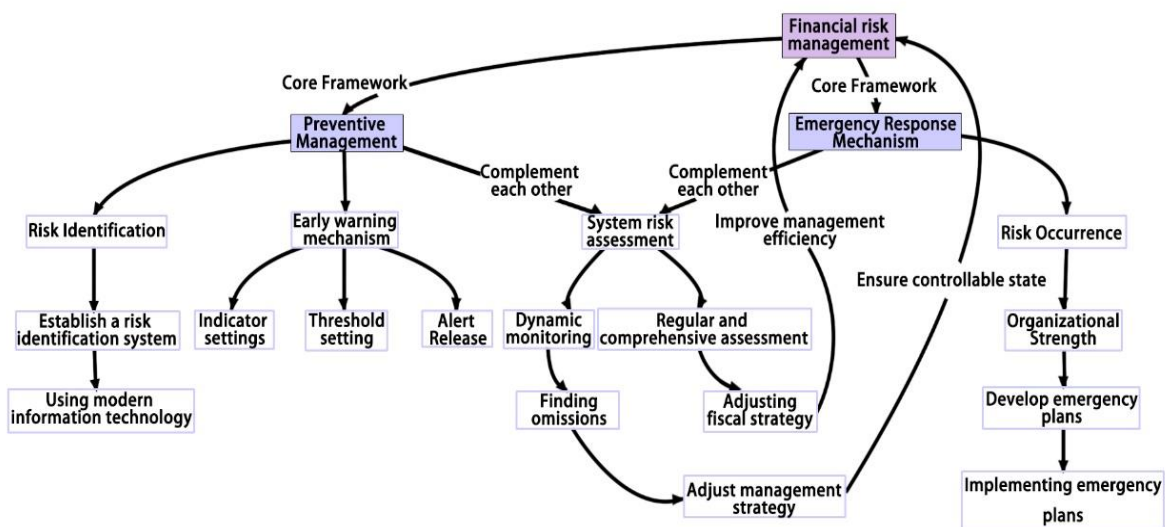


Fig. 1.2.2 Operational mechanism of the core framework for fiscal risk management

1.2.2 Strategy Selection

The choice of fiscal risk management strategy is the key to ensuring fiscal sustainability and stability [32]. For the priority of strategy selection, I have specially created a quantitative diagram, as shown in Fig. 1.2.3 Quantitative diagram of priority for ensuring fiscal health. In the face of complex and changing fiscal risks, the government needs to flexibly use a variety of strategies to deal with them according to the specific types, scales and tolerance of risks [33]. Next, we will explore in detail the application of strategies such as structural optimization, operational norms, and the use of financial instruments in actual fiscal risk management.

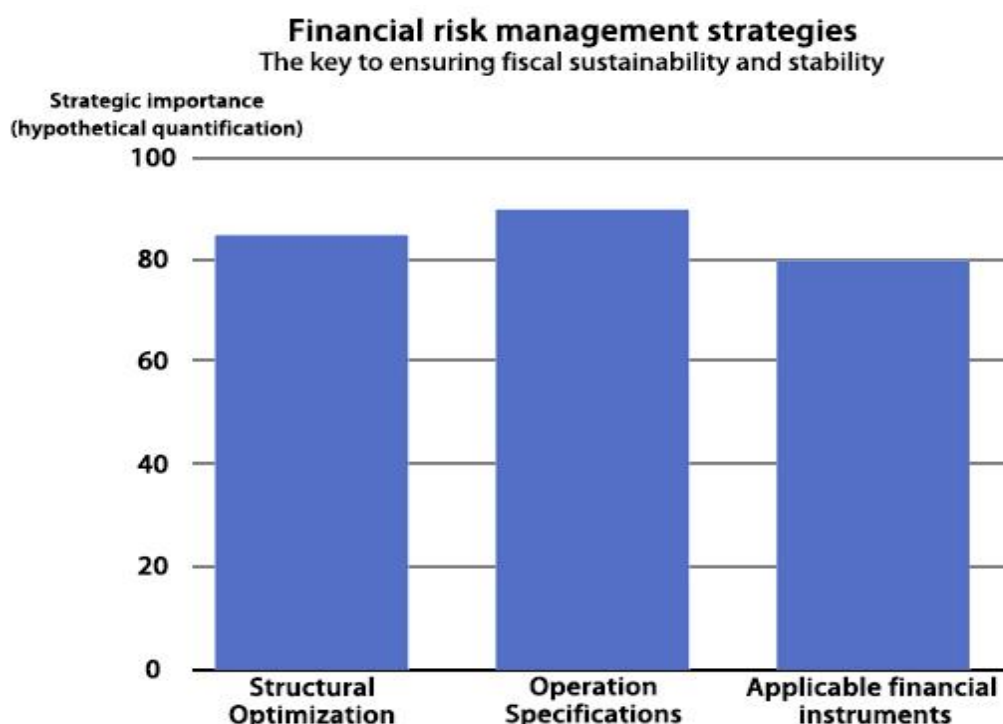


Fig. 1.2.3 Quantitative diagram of priority for ensuring fiscal health

In the selection of fiscal risk strategies, structural optimization is the primary consideration. This is mainly related to the structural adjustment of fiscal revenue and expenditure, as well as the optimization of fiscal policy. On the one hand, the government needs to optimize the fiscal revenue structure and ensure the stability and growth of fiscal revenue by adjusting tax policies and increasing non-tax revenue. For example, in recent years, my country has continued to promote tax

system reform, such as the reduction of value-added tax rates and the deepening of personal income tax reform. These measures have not only reduced the tax burden on enterprises and individuals, but also promoted the continuous growth of tax revenue. On the other hand, the government also needs to optimize the structure of fiscal expenditure and strengthen investment in key areas and weak links, such as education, medical care, social security and other livelihood areas, as well as strategic emerging industries such as scientific and technological innovation and green development, thereby improving the efficiency and effectiveness of fiscal expenditure.

Operational norms are another important strategy for fiscal risk management. This requires the government to establish and improve relevant systems and norms in fiscal revenue and expenditure, budget management, debt management, etc. to ensure the compliance and transparency of fiscal operations [34]. For example, in terms of budget management, the government must strictly follow the requirements of the Budget Law to prepare and implement the budget, strengthen budget supervision and auditing, and prevent budget overspending and waste. In terms of debt management, the government needs to establish and improve the debt management system, reasonably control the debt scale, optimize the debt structure, and avoid debt risks. The government also needs to strengthen the openness and transparency of fiscal information, enhance the public's awareness and participation in fiscal policies, and thus enhance the credibility and execution of fiscal policies.

The use of financial instruments is also one of the important strategies for fiscal risk management [35]. With the continuous development of financial markets and the continuous innovation of financial instruments, the government can use financial instruments to manage risks, such as using derivatives such as futures and options to hedge risks, and using financing tools such as bonds and stocks to raise funds. For example, the government can raise funds for infrastructure construction and people's livelihood improvement by issuing bonds such as treasury bonds and local government bonds. At the same time, it can also adjust market liquidity and stabilize market expectations through the operation of the bond market. The

government can also use the information advantages and risk management techniques of the financial market to monitor and warn of fiscal risks, so as to timely detect and respond to potential risks.

In actual operations, the government needs to flexibly combine and apply the above strategies based on the specific circumstances of fiscal risks and its own conditions [36]. Based on the specific strategy logic mentioned above, I have created a process diagram as shown in the Fig. 1.2.4 Schematic diagram of the process for selecting financial risk management strategies. For example, when facing downward economic pressure, the government can adopt fiscal policies such as tax cuts and fee reductions, and increase spending to stimulate economic growth and stabilize market expectations. The government can also use financial instruments to raise funds and hedge risks to ease fiscal pressure and prevent risks [37]. When facing debt risks, the government needs to strengthen debt management, optimize debt structure, and prevent debt crises. The government also needs to strengthen cooperation with international financial institutions and international markets, learn from international advanced experience and technology, and improve the level and ability of fiscal risk management [38].

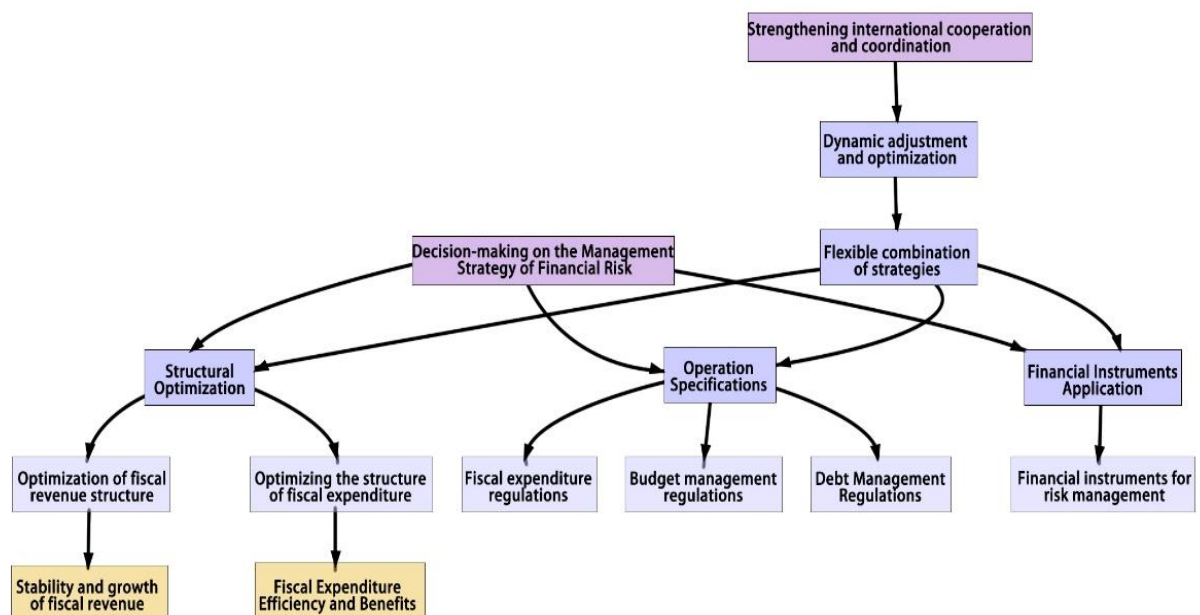


Fig. 1.2.4 Schematic diagram of the process for selecting financial risk management strategies

It is worth noting that the strategic choice of fiscal risk management is not fixed, but needs to be dynamically adjusted and optimized according to changes in domestic and foreign economic situations and adjustments in fiscal policies [39]. For example, in the context of global economic integration and the continuous opening of financial markets, the government needs to pay close attention to the dynamics and risks of the international financial market, strengthen cooperation and coordination with international financial institutions, and jointly respond to global financial risks. The government also needs to strengthen the supervision and risk prevention of the domestic financial market to prevent the transmission and spread of financial risks to the fiscal field.

The strategic selection of fiscal risk management is a complex and systematic process, which requires the government to flexibly adopt strategies such as structural optimization, operational norms, and the use of financial instruments based on the risk type, scale, and its own tolerance [40]. The government also needs to strengthen cooperation and coordination with international financial institutions and international markets to jointly respond to global financial risks and challenges. By continuously optimizing and improving the strategic selection of fiscal risk management, the government can better respond to various fiscal risks and challenges, ensure the sustainability and stability of finance, and provide strong guarantees for the sustained and healthy development of the economy and society [41].

1.3 Composition of fiscal risk management system

1.3.1 Identification link

The identification stage of fiscal risk is the first step in the fiscal risk management system, and its criticality is beyond doubt. Through accurate risk identification, the government can timely control the potential risk points in the fiscal situation, and provide a solid foundation for subsequent risk assessment, response and monitoring [42]. In this link, data analysis plays a vital role. It can not

only help discover potential risks, but also improve the accuracy of risk identification by means of historical data and scenario analysis.

The application of data analysis in fiscal risk identification is mainly reflected in two aspects: one is the deep mining of historical data, and the other is the simulation of future scenarios. Historical data is the key basis for fiscal risk identification. By sorting out and analyzing data such as fiscal revenue and expenditure, debt scale, and economic development level over the years, the evolution law and potential trend of fiscal risks can be revealed. For example, through the analysis of local government debt data in the past ten years, it can be found that there is a certain correlation between debt scale and economic growth rate and fiscal revenue growth rate. When economic growth slows down or fiscal revenue growth is weak, debt risk usually rises [43]. This kind of analysis based on historical data can provide the government with early warning signals, allowing it to implement corresponding measures before the risk breaks out.

Scenario analysis is a way to simulate possible fiscal risk scenarios in the future. By constructing different hypothetical conditions, it analyzes the possible presentation of fiscal risks under these conditions. This method can help the government to more comprehensively understand the diversity and complexity of fiscal risks, so as to formulate more flexible and effective response strategies. For example, it can be assumed that in the context of the global economic recession, exports will decline and corporate efficiency will decrease, resulting in a significant reduction in fiscal revenue, while social security expenditures will increase, forming a fiscal revenue and expenditure gap [44]. Through scenario analysis, the government can assess the impact of such risks on fiscal stability and formulate response measures in advance, such as adjusting the structure of fiscal expenditures and increasing fiscal reserves.

In the process of data analysis, attention should also be paid to the accuracy and integrity of the data. The data relied on for fiscal risk identification must come from authoritative institutions to ensure the authenticity and reliability of the data. The collection and processing of data needs to follow scientific methods and norms

to avoid identification bias caused by data errors or omissions [45]. With the continuous development of information technology, the application of advanced technologies such as big data and artificial intelligence in fiscal risk identification is becoming more and more extensive. These technologies can process massive amounts of data and discover implicit relationships between data, thereby improving the efficiency and accuracy of risk identification.

In addition to data analysis, fiscal risk identification also needs to be considered in combination with macroeconomic environment, policy adjustments, internal management and other factors [46]. Changes in the macroeconomic environment are important factors affecting fiscal risk. For example, changes in economic growth rate, inflation rate, interest rate level, etc. may affect fiscal revenue and expenditure, thereby triggering fiscal risk. Policy adjustments are also an important source of fiscal risk. For example, changes in tax policies and expenditure policies may lead to an imbalance between fiscal revenue and expenditure, increasing fiscal risk. Internal management factors should not be underestimated. For example, the degree of perfection of the fiscal system and the professional quality of fiscal personnel will affect the management effect of fiscal risk [47].

In the identification link, an effective risk warning mechanism needs to be established. The warning mechanism is an important component of fiscal risk identification. It can monitor the changes in fiscal risk in real time by setting warning indicators and thresholds. Once the risk exceeds the warning line, it can issue a warning signal in time to provide a basis for decision-making for the government. The construction of the warning mechanism needs to comprehensively consider various factors of fiscal risk, scientifically set warning indicators and thresholds, and ensure the accuracy and timeliness of the warning [48]. The early warning mechanism also needs to be closely linked with risk assessment, response and monitoring to form a complete fiscal risk management system.

In order to improve the accuracy of fiscal risk identification, it is also necessary to strengthen the training and introduction of fiscal risk management talents [49]. Fiscal risk management is a highly professional job that requires solid

knowledge of finance, economics, etc. Therefore, the government should increase the training of fiscal risk management talents and improve the professional quality and management ability of fiscal personnel through training courses and seminars. It can also actively introduce outstanding fiscal risk management talents at home and abroad to provide intellectual support for fiscal risk management.

Strengthening the informatization construction of fiscal risk management is also an important way to improve the accuracy of risk identification [50]. Informatization construction can improve the efficiency and accuracy of data processing and realize real-time monitoring and dynamic management of fiscal risks. The government should increase investment in the fiscal risk management information system, promote the upgrading and improvement of the system, and improve the intelligence and automation level of the system. It is also necessary to strengthen the security protection of the information system to ensure the security and confidentiality of data.

The identification of fiscal risks is a key step in the fiscal risk management system [51]. The core task of this link is to discover potential risks through data analysis and improve the accuracy of risk identification by using historical data and scenario analysis. In the identification process, it is necessary to comprehensively consider factors such as the macroeconomic environment, policy adjustments, and internal management, establish an effective risk warning mechanism, strengthen the training and introduction of financial risk management talents, and promote the informatization of financial risk management [52]. Only in this way can we ensure the accuracy and timeliness of financial risk identification, provide a scientific basis for the government's financial decision-making, and ensure financial stability and sustainable development.

1.3.2 Evaluation link

In the fiscal risk management system, the evaluation link plays a vital role. It is not only a bridge between identification and response, but also a cornerstone to ensure the scientific and forward-looking nature of fiscal decision-making. The core

task of the evaluation link is to comprehensively and accurately predict the possibility of risks and their potential impacts through a combination of qualitative and quantitative methods, and provide a strong basis for decision makers.

Qualitative evaluation mainly relies on the experience and judgment of experts, and identifies the key factors and possible development trajectories of risks through in-depth analysis of historical cases [53]. This process involves the intersection of multidisciplinary knowledge, such as economics, finance, and political science, requiring the evaluator to have a high degree of professionalism and keen insight. The advantage of qualitative evaluation is that it can capture risk factors that are difficult to quantify, such as policy changes and social emotions, and provide rich background information for decision-making. However, qualitative evaluation also has a certain degree of subjectivity, and different experts may come to different conclusions. Therefore, it is necessary to establish an effective mechanism to ensure the objectivity and consistency of the evaluation.

Quantitative evaluation uses mathematical models and statistical methods to quantify risks. This process usually includes data collection, cleaning, analysis and interpretation [54]. In the Internet era, the widespread application of big data technology has provided unprecedented convenience for quantitative evaluation. By mining and analyzing massive amounts of financial data, economic data, social data, etc., the probability of occurrence and potential impact of risks can be predicted more accurately. For example, using machine learning algorithms, historical data can be deeply learned to identify hidden patterns and correlations of risks, providing a more accurate prediction model for risk assessment. The advantages of quantitative assessment are its objectivity and repeatability, which can reduce the interference of human factors and improve the accuracy and credibility of assessment.

In fiscal risk management, qualitative and quantitative assessments should complement and verify each other [55]. Qualitative assessment can provide background and framework for quantitative assessment, help understand the nature and root causes of risks; while quantitative assessment can provide data and evidence for qualitative assessment, enhance the persuasiveness and practicality of

assessment. Only by combining the two organically can fiscal risks be comprehensively and accurately assessed and a scientific basis for decision-making be provided.

The assessment process faces many challenges. On the one hand, fiscal risks involve multiple fields and multiple levels, and risk factors are numerous and intertwined. Effectively identifying and assessing these risks is a complex and arduous task. On the other hand, fiscal risk is dynamic and uncertain. With the passage of time and changes in the environment, the form and degree of risk may change significantly, which requires the assessor to track and update the assessment results in a timely manner to ensure the timeliness and accuracy of the assessment.

In order to improve the efficiency and effectiveness of fiscal risk assessment, the following measures can be taken: First, establish a sound risk assessment system, clarify the goals, principles and methods of assessment, and ensure the standardization and systematicness of the assessment; second, strengthen data collection and collation, improve the quality and availability of data, and provide a solid foundation for assessment; third, introduce advanced technologies and methods, such as big data and artificial intelligence, to enhance the intelligence and automation level of assessment; fourth, strengthen personnel training and team building, improve the professional quality and comprehensive ability of assessors, and ensure the professionalism and accuracy of assessment.

The assessment link should be closely linked with the identification, response and monitoring links to form a closed-loop management [56]. In the identification link, various information and technical means should be fully utilized to timely discover and report potential risks; in the response link, targeted response measures and plans should be formulated based on the assessment results to ensure that risks are effectively controlled and resolved; in the monitoring link, a sound early warning and reporting mechanism should be established to track the changes and development of risks in real time and provide timely and accurate information support for decision-making.

The evaluation link occupies an important position in the fiscal risk management system. By combining qualitative and quantitative methods, a comprehensive and accurate assessment of the possibility of risks and their potential impact can not only provide a scientific basis for decision-making, but also improve the scientific nature and foresight of fiscal management. Therefore, we should attach great importance to the work of the evaluation link, continuously improve the evaluation system and methods, improve the accuracy and credibility of the evaluation, and provide strong support for fiscal risk management.

1.3.3 Response link

In the fiscal risk management system, responding to this link is a key step to ensure that risks can be effectively controlled. This link requires the government and relevant departments to implement scientific and reasonable measures based on the identification and assessment of fiscal risks, optimize fiscal policies, and rationally allocate resources, so as to minimize the negative effects of risks. Effective response measures can not only relieve fiscal pressure, but also provide strong support for the smooth operation of the economy.

When responding to fiscal risks, optimizing fiscal policies is the top priority [57]. Policymakers need to adjust the structure of fiscal expenditure and revenue according to the specific circumstances of the risks to ensure the pertinence and effectiveness of policies. For example, when facing downward economic pressure, the government can stimulate economic growth and ease the contradiction between fiscal revenue and expenditure by increasing public investment and implementing tax cuts and fee reductions. In response to fiscal risks caused by emergencies such as natural disasters and public health events, the government should immediately activate the emergency response mechanism, adjust the fiscal expenditure structure, and give priority to protecting the basic living needs of disaster-stricken areas and groups, as well as emergency expenditures such as epidemic prevention and control [58].

Reasonable allocation of resources is another important aspect of responding to fiscal risks. The government needs to build a complete resource allocation mechanism to ensure that funds, materials and other resources can be invested efficiently and accurately in key areas of risk response. This requires the government and relevant departments to strengthen communication and coordination, form a joint force, and avoid resource waste and duplication. For example, when responding to natural disasters, the government should uniformly dispatch rescue materials and funds to ensure that the affected areas can obtain rescue and support in a timely manner. The government should also strengthen cooperation with all sectors of society, encourage enterprises, social organizations and individuals to participate in risk response, and form a strong joint force for the whole society to jointly resist risks.

In the process of responding to fiscal risks, it is extremely important to ensure the effectiveness and timeliness of measures [59]. The government and relevant departments should build a sound risk assessment and monitoring mechanism to track and evaluate the implementation of risk response measures in real time. Once it is found that the measures are ineffective or have problems, they should be adjusted and optimized in a timely manner to ensure that risks are effectively controlled. The government should also strengthen information disclosure and transparency, promptly inform the public of the progress and results of risk response, and enhance the public's trust and support.

With the continuous development of Internet technology, new technologies such as big data and cloud computing are increasingly used in fiscal risk management. These technologies provide the government with more accurate and efficient means of risk response. For example, the government can use big data technology to conduct in-depth mining and analysis of fiscal revenue and expenditure data, explore potential risk points and weak links, and provide strong support for the formulation of targeted response measures. Cloud computing technology can provide the government with powerful data storage and processing capabilities to ensure the smooth implementation of risk response work.

The government should also pay attention to the flexibility and innovation of risk response [60]. Faced with complex and changing fiscal risks, the government should flexibly adjust its response strategies and measures to adapt to the characteristics and changes of different risks. The government should also encourage innovation, actively explore new risk response methods and means, and improve the efficiency and effectiveness of risk response. For example, the government can introduce market mechanisms, guide social capital to participate in risk response through government procurement of services, public-private partnerships, and other forms, and build a diversified risk response system.

Strengthening personnel training and capacity building is also an important measure to improve the level of fiscal risk response [61]. The government should strengthen the training and education of fiscal risk management personnel to improve their professional quality and response capabilities. The government should also build a sound incentive mechanism to encourage fiscal risk management personnel to actively learn new knowledge and skills and continuously improve their comprehensive quality and response level.

The response link plays an extremely important role in the fiscal risk management system. The government and relevant departments should optimize fiscal policies, rationally allocate resources, ensure the effectiveness and timeliness of measures, strengthen technological innovation and personnel training, and continuously improve the level and ability of fiscal risk response. Only in this way can we ensure that fiscal risks are effectively controlled and provide strong guarantees for the smooth operation of the economy and the harmony and stability of society.

1.3.4 Monitoring link

In the fiscal risk management system, the monitoring link is the key to ensure the effective operation of the entire system, and it shoulders the important responsibilities of real-time tracking, early warning and feedback. The implementation of this link requires not only the construction of an efficient and

sensitive early warning system, but also the dynamic and visualized management to improve the efficiency and accuracy of monitoring.

The construction of the early warning system is the core point of the monitoring link [62]. This system should be based on advanced information technology, such as big data analysis, cloud computing, etc., to carry out real-time monitoring of various indicators in fiscal operations. The function of the early warning system is not limited to the simple identification of risks. More importantly, it can predict and evaluate potential risks based on preset thresholds and models. For example, the system can identify the changing trends of key indicators such as fiscal revenue, expenditure, and debt by analyzing historical data. Once abnormal fluctuations are detected, the early warning mechanism will be automatically triggered to send alerts to relevant departments and decision makers in a timely manner.

Achieving real-time dynamic management is another important goal of the monitoring link. This requires the early warning system to not only provide static risk reports, but also to update risk assessment results in real time according to changes in fiscal conditions, and provide dynamic risk management suggestions for decision makers. The advantage of dynamic management is that it can help decision makers adjust policies in a timely manner and effectively respond to the risks brought about by market changes and economic fluctuations. For example, during a period of economic downturn, the system can monitor the growth of fiscal revenue in real time. Once it is found that revenue growth slows down or shows negative growth, it will recommend that the government take measures such as tax cuts and fee reductions, and increase fiscal expenditures to stimulate economic growth and prevent further accumulation of fiscal risks.

Data visualization plays a key role in improving monitoring efficiency [63]. By converting complex data into intuitive charts, images and other forms, decision makers can more quickly understand the changing trends and distribution characteristics of fiscal risks, and thus make more accurate decisions. Data visualization not only improves the readability and comprehensibility of

information, but also enhances the intuitive feelings of decision makers, enabling them to grasp the key points and difficulties of risk management more quickly. For example, the system can display data such as fiscal revenue, expenditure, and debt in the form of a time series graph, allowing decision makers to see the historical changes and future trends of various indicators at a glance, providing strong support for the formulation of risk management strategies.

In the actual operation process, the implementation of the monitoring link still faces some challenges. On the one hand, data collection and integration are difficult. Since fiscal data involves multiple departments and fields, the data formats and standards are not the same, which brings great difficulties to the collection and integration of data. In order to solve this problem, it is necessary to establish a unified data standard and exchange mechanism to ensure the accuracy and consistency of data[64]. On the other hand, the complexity of data analysis should not be underestimated. The formation and evolution of fiscal risks are affected by many factors. How to dig out useful information from these complex data places high demands on the professional quality and technical capabilities of analysts. Therefore, strengthening the training and technical support of analysts and improving the accuracy and efficiency of data analysis are important tasks in the implementation of the monitoring link.

The monitoring link also needs to work closely with other links to form a complete risk management chain. The identification link provides risk information and data support for the monitoring link, and the assessment link conducts quantitative and qualitative analysis of risks, providing risk assessment results and warning thresholds for the monitoring link. The response link takes corresponding policy measures based on the risk warnings and suggestions provided by the monitoring link to resolve and reduce fiscal risks. Therefore, strengthening information sharing and collaboration among various links and forming a joint force to deal with fiscal risks are the key to improving the effectiveness of fiscal risk management.

In the implementation process of the monitoring link, it is also necessary to focus on technological innovation and system construction. On the one hand, we should continue to explore and apply new technologies, such as artificial intelligence and blockchain, to improve the intelligence level and data processing capabilities of the early warning system. On the other hand, we should establish and improve relevant systems and norms, clarify the responsibilities and powers of various departments, and ensure the smooth implementation and effective operation of the monitoring link. We should also strengthen personnel training and technical support, improve the professional quality and technical capabilities of analysts and decision makers, and provide strong guarantees for the sustainable development of fiscal risk management.

The monitoring link occupies a vital position in the fiscal risk management system. By building an early warning system, realizing real-time dynamic management, and applying data visualization methods, the efficiency and accuracy of monitoring can be improved, and timely and accurate risk management suggestions can be provided to decision makers. However, the implementation of the monitoring link also faces many challenges and difficulties. It is necessary to continuously strengthen technological innovation and system construction, and improve the professional quality and technical capabilities of analysts and decision makers. Only in this way can the effective operation and sustainable development of the fiscal risk management system be ensured.

CHAPTER 2

IMPLEMENTATION CASE OF FISCAL RISK MANAGEMENT SYSTEM

2.1 Fiscal Risk Management in China

2.1.1 Analysis of China's current financial risk management system

At present, China has built a relatively complete management system in the field of fiscal risk management, aiming to identify and prevent fiscal risks and ensure the sound operation of the national finance through a series of strict regulations and mechanisms. In order to effectively manage local government debt, China has taken a number of strict control measures, such as setting a debt ceiling, strengthening the supervision of debt issuance and use, and establishing a sound risk prevention and control mechanism to effectively control debt risks.

According to the latest data released by the Ministry of Finance, by the end of 2023, the total debt of local governments in China will be about 31.5 trillion yuan, and the proportion of gross domestic product (GDP) will remain in a reasonable range. For the specific data, I made a table to show it. As shown in Table 2.1.1 China Local Government Debt Data Table. In order to further prevent the risks brought by hidden debt, the central government has repeatedly emphasized the principle of "whoever borrows is responsible" and actively promoted local governments to gradually resolve hidden debt. In this regard, Guangdong Province, as a pioneer, successfully achieved the comprehensive elimination of regional hidden debt in 2023. This achievement not only provides valuable experience for other regions, but also sets an example for the whole country.

China's "Fiscal Law" clearly stipulates that governments at all levels must ensure fiscal balance and prohibit the preparation of deficit budgets. However, in actual operation, considering the special needs of local development, the central government allows local governments to make up for the fiscal revenue and expenditure gap by issuing local government bonds under certain conditions. In addition, the central government also provides financial support to local

governments through various means such as transfer payments to ensure that local governments can meet the basic public service needs and promote the coordinated development of regional economy. According to data from the Ministry of Finance, the total amount of central transfer payments to local governments in 2023 will reach about 9 trillion yuan, which greatly guarantees the stable operation of local finances. For the specific data, I made a table to show it. As shown in Table 2.1.2 Central transfer payments and fiscal deficit relationship table.

Table 2.1.1 China Local Government Debt Data Table

Years	Local debt (trillion yuan)	GDP (trillion yuan)	Proportion of GDP (%)
2015	16.8	68.9	24.4
2016	18.2	74.0	24.6
2017	20.0	82.1	24.4
2018	22.5	90.0	25.0
2019	25.0	98.0	25.5
2020	27.8	101.6	27.4
2021	29.0	113.0	25.7
2022	30.0	118.2	25.4
2023	31.5	121.0	26.0

China's fiscal risk management system includes not only the above measures, but also covers risk warning and response mechanisms. Financial departments at all levels regularly collect and analyze fiscal data, use advanced risk warning models, timely identify potential risk points, and conduct scientific assessments. Once any hidden dangers that may threaten fiscal security are found, the relevant departments will quickly launch emergency plans and take effective measures to solve them to prevent the spread of risks.

Although China has achieved certain results in fiscal risk management, with the continuous changes in the global economic environment, China's finances still face many challenges and uncertainties. Therefore, it remains the focus of future work to continuously improve and optimize the fiscal risk management system and enhance the ability to cope with various complex situations. This will not only help maintain the security and stability of the country's finances, but will also provide a solid guarantee for the sustainable development of China's economy and society.

Table 2.1.2 Central transfer payments and fiscal deficit relationship table

Years	Fiscal Deficit (trillion yuan)	Transfer payments (trillion yuan)	Proportion of fiscal deficit (%)
2015	1.6	7.2	450
2016	2.0	7.5	375
2017	2.2	7.8	355
2018	2.6	8.2	315
2019	3.0	8.6	287
2020	3.8	8.9	234
2021	3.5	9.1	260
2022	3.7	9.2	249
2023	3.9	9.0	231

2.1.2 Example Analysis

In the practice of fiscal risk management, the importance of local debt management cannot be ignored [65]. The government usually implements a series of fiscal policy measures to promote local economic recovery. First of all, it usually adopts tax reduction and fee reduction policies, which is a very critical link [66] and an important measure to cope with economic downward pressure [67]. However, relying solely on tax reduction policies cannot fundamentally solve fiscal problems.

Table 2.1.3 Jiangsu Provincial Government Debt Data Table

Years	Total debt (100 million yuan)	Total local GDP (100 million yuan)	Proportion of fiscal deficit (%)
2015	10556	70093	15.06
2016	10915	77411	14.10
2017	12026	85900	14.0
2018	13286	92585	14.35
2019	14878	98660	15.08
2020	17228	102731	16.77
2021	18964	116343	16.3
2022	20694	122885	16.84
2023	22733	128222	0

As one of the economically developed provinces in my country, Jiangsu Province has actively explored innovative management methods to effectively prevent and control fiscal risks in the face of a complex fiscal environment and increasing debt pressure. To this end, Jiangsu Province decided to build a fiscal risk management system, strengthen supervision through division of labor and

cooperation between the central and local governments, implement debt risk warning, and ensure the smooth operation of the fiscal system.

Judging from the data on Jiangsu provincial government debt and its proportion to GDP, although the total debt has increased in the past few years, the proportion of debt to GDP has always remained at a relatively low and stable level. In the current economic fluctuations, most provinces have undergone relatively large changes, but Jiangsu Province still maintains a low debt risk state, below the average level and far below the debt warning line set by the state (60%). This shows that Jiangsu Province's fiscal risk management system has played a role to a certain extent and effectively controlled debt risks.

The background of Jiangsu Province's construction of a fiscal risk management system is mainly due to a deep understanding of the importance of fiscal risk management. With the rapid development of the economy and society, the scale of local fiscal revenue and expenditure has continued to expand, and fiscal risks have also increased. In particular, local debt issues have become a key factor affecting fiscal stability and economic security. In order to effectively respond to this challenge, Jiangsu Province decided to learn from international advanced experience and combine the actual situation of the province to build a scientific and efficient fiscal risk management system.

The goal of system construction is very clear, that is, through the division of labor between the central and local governments, to achieve comprehensive supervision and early warning of fiscal risks, reduce the incidence of fiscal risk events, and improve the efficiency of the use of fiscal funds. To this end, Jiangsu Province has set up a special working group to be responsible for the planning, design and implementation of the system. The working group works closely with the central fiscal department to clarify the division of responsibilities between the central and local governments in fiscal risk management and ensure the effective connection and implementation of policies.

During the construction process, Jiangsu Province introduced advanced risk management theories and technologies and developed a risk early warning model.

Based on big data and artificial intelligence technology, this model can conduct in-depth mining and analysis of fiscal data, timely discover potential risk points, and provide strong support for risk prevention and control. Jiangsu Province integrates fiscal data resources and establishes a fiscal risk database, which provides a solid data foundation for the operation of the risk early warning model.

After careful preparation and meticulous implementation, the Jiangsu Provincial Fiscal Risk Management System was officially launched. During the implementation process, Jiangsu Province comprehensively sorted out and integrated the province's fiscal data to ensure the accuracy and completeness of the data, used the risk early warning model to identify and evaluate the risks of the actual data, and formulated targeted risk prevention and control measures based on the early warning results, strengthened communication and coordination with the central fiscal department, and ensured the effective implementation of the policy.

The system has achieved remarkable results since its launch. The incidence of fiscal risk events has been significantly reduced, thanks to the accurate early warning of the risk early warning model and the timely formulation of prevention and control measures; the efficiency of the use of fiscal funds has been significantly improved, mainly due to the system's optimized allocation and rational use of fiscal resources, avoiding idle funds and waste. The operation of the system also realizes real-time monitoring and early warning of fiscal risks, improves the timeliness of risk prevention and control, and helps Jiangsu Province to timely discover and resolve potential risk points and ensure the stable operation of the fiscal system.

In addition to the above achievements, the fiscal risk management system of Jiangsu Province has also strengthened the coordination and cooperation between the central and local governments in fiscal risk management. Through the information sharing and communication and coordination mechanism of the system, the efficiency of central and local policy implementation has been significantly improved, forming a joint force to deal with fiscal risks and improving the overall management efficiency. The operation of the system has also optimized the allocation of fiscal resources and improved the efficiency of fund use, which is

conducive to Jiangsu Province to better serve the overall economic and social development and promote the sustained and healthy development of the economy.

Jiangsu Province has achieved remarkable results in its practical exploration of local debt management. Jiangsu Province has effectively reduced the incidence of fiscal risk events and improved the efficiency of the use of fiscal funds by building a fiscal risk management system under the central and local division of labor mechanism and strengthening supervision and early warning work. This approach not only provides a strong guarantee for the financial stability and economic security of Jiangsu Province, but also provides a useful reference for other regions. In the future, with the continuous advancement of technology and the continuous improvement of management, it is believed that Jiangsu Province will achieve more significant results in financial risk management.

2.2 International fiscal risk management case

2.2.1 US Case Study

As one of the world's largest economies, the construction and implementation of the US fiscal risk management system has extremely high research value, especially in the construction of fiscal risk monitoring platforms, the application of big data and artificial intelligence technologies, etc. It is in a world-leading position and provides valuable experience and inspiration for other countries in the world.

The construction of the US fiscal risk monitoring platform is a key link in its fiscal risk management system. The platform integrates data from governments at all levels, financial institutions and markets to achieve all-round and real-time monitoring of fiscal risks. The construction of the platform not only relies on advanced technical support, but also relies on a complete legal system and policy framework. The United States has clarified the responsibilities and powers of fiscal risk monitoring through legislation to ensure the legality and effectiveness of the platform's operation. The platform has also established close cooperative relations with major financial institutions, research institutions and international

organizations to share data resources and improve the accuracy and timeliness of risk warnings.

In the application of big data and artificial intelligence technologies, the US fiscal risk monitoring platform has shown strong technical innovation. The platform uses big data technology to efficiently process and analyze massive data, dig out potential risk factors, and provide strong data support for risk warnings. The introduction of artificial intelligence technology has further enhanced the platform's risk identification and assessment capabilities. Through algorithms such as machine learning and deep learning, the platform can automatically learn risk patterns, predict risk trends, and provide decision makers with scientific and accurate decision-making basis.

Specifically, the US fiscal risk monitoring platform has achieved remarkable results in the following aspects:

First, it has improved the timeliness of risk warning. By real-time monitoring of market dynamics, economic indicators and government fiscal conditions, the platform can promptly detect potential risks and provide time advantages for government decision-making. For example, according to data from the US Treasury Department, since 2010, the platform has successfully warned of more than 100 potential fiscal risk events, with an average warning time of about 3 months in advance, which has won valuable time for the government to take countermeasures.

Second, it has improved the accuracy of risk warning. The platform uses technologies such as big data and artificial intelligence to conduct in-depth analysis of complex risk factors and improve the accuracy of risk identification. According to statistics, the accuracy of risk warnings on the platform has exceeded 90%, significantly improving the efficiency of the government in responding to fiscal risks.

Third, it has promoted the scientific nature of fiscal decision-making. The data support and risk warnings provided by the platform provide a scientific basis for government decision-making. Decision makers can formulate more reasonable and feasible fiscal policies based on the information provided by the platform to improve

the efficiency of fiscal management. According to the Congressional Budget Office of the United States, since the platform was put into use, the US government's fiscal policy adjustments have become more precise, and the efficiency of fiscal expenditure has increased by about 15%.

Fourth, it has promoted the transparency of fiscal management. Through information disclosure, the platform has improved the transparency of fiscal management and increased public participation and trust. According to a survey by the Pew Research Center in the United States, more than 80% of Americans believe that the fiscal risk monitoring platform has improved the transparency of fiscal management and enhanced their trust in the government's fiscal policy.

Based on specific examples, the fiscal risk monitoring platform has played an important role in the United States' response to the financial crisis. During the 2008 financial crisis, the platform monitored market dynamics in real time, discovered clues to financial risks in a timely manner, and issued early warnings to the government. Based on the platform's early warning information, the government quickly took measures such as strengthening financial supervision and providing emergency loans, effectively curbing the spread of financial risks and maintaining financial market stability.

In addition, the US fiscal risk monitoring platform has also played an important role in local government debt management and social security fund operations. By monitoring the scale of local government debt, debt repayment capacity, and social security fund revenue and expenditure, it provides decision-making support for local governments and social security agencies to ensure fiscal sustainability and stability. According to data from the U.S. Treasury Department, since the platform began monitoring local government debt, the default rate of local government debt has dropped by about 30%, and the stable operation of the social security fund has also been effectively guaranteed.

However, the U.S. fiscal risk monitoring platform also faces some challenges, such as the difficulty of data integration and sharing, the speed of technology updates, and changes in the policy environment, which have put forward higher

requirements for the operation of the platform. In response to these challenges, the U.S. government has continuously increased its investment in the platform, strengthened technology research and development and talent training, improved the legal system and policy framework, and ensured the continued stable operation of the platform.

The construction of the U.S. fiscal risk monitoring platform and the application of big data and artificial intelligence technologies have provided strong support for the improvement of its fiscal risk management system. The successful experience of the platform is of great reference significance to countries around the world. By learning and drawing on the practices of the United States, countries can build a fiscal risk management system suitable for their actual conditions and improve the efficiency and level of fiscal management. At the same time, countries should also strengthen international cooperation and exchanges to jointly respond to global fiscal risk challenges and maintain the stability and prosperity of the global economy.

2.2.2 EU Case Study

As an important organization for global economic integration, the EU's fiscal risk management mechanism is highly representative and instructive. Through the Stability and Growth Pact and the fiscal supervision agencies established, the EU has achieved remarkable results in maintaining the consistency and transparency of the fiscal policies of its member states.

The core of the EU's fiscal risk management lies in the implementation of the Stability and Growth Pact. The Pact aims to promote stable economic growth in member states and avoid excessive deficits and debt accumulation. The Pact stipulates that the fiscal deficit of member states shall not exceed 3% of GDP and the public debt shall not exceed 60% of GDP. Since the implementation of the Pact, the average fiscal deficit rate of EU member states has dropped from 3.3% in 2000 to 1.6% in 2023, and the public debt rate has gradually dropped from 80.2% in 2010 to 67.5% in 2023. These data show that the Pact has effectively constrained the fiscal

behavior of member states and prevented economic risks caused by fiscal out-of-control.

In order to ensure the effective implementation of the Stability and Growth Pact, the EU has established fiscal supervision agencies such as the European Commission and the Economic and Fiscal Committee to monitor the fiscal situation of member states. According to the European Commission, since 2005, these supervisory bodies have issued fiscal warnings to more than 30 member states and successfully prompted these countries to take corrective measures. Among them, more than 90% of the warnings received positive responses, and member states took necessary fiscal adjustment measures within 6 months after receiving the warnings on average.

In the specific practice of fiscal risk management, the EU pays attention to cooperation and information sharing among member states. By regularly holding meetings of finance ministers and economic and fiscal committees, communication and coordination among member states are strengthened. According to statistics, more than 50 relevant meetings are held each year, covering a wide range of topics, including fiscal policy coordination, debt sustainability, tax reform, etc. In addition, the EU has also established a fiscal database and information system to achieve real-time sharing and monitoring of member states' fiscal data. As of 2023, the system has integrated more than 1 million fiscal data points from all member states, providing strong data support for fiscal risk management.

Another major feature of EU fiscal risk management is the combination of prevention and response strategies. When risks occur, the EU can quickly take countermeasures. For example, during the global financial crisis in 2008, the EU launched the European Financial Stability Mechanism (EFSM) and the European Stability Mechanism (ESM) to provide financial assistance to member states, effectively alleviating the impact of the crisis on the economies of member states. According to statistics, since the establishment of the ESM, more than 250 billion euros of aid funds have been provided to member states.

It is worth noting that the EU fiscal risk management mechanism is not static. Under the impact of the global economic crisis, the EU adjusted the Stability and Growth Pact and relaxed restrictions on member states' fiscal deficits and debts. This adjustment reflects the flexibility and adaptability of the EU fiscal risk management mechanism. According to data from the European Statistical Office, this adjustment helped member states maintain necessary fiscal stimulus measures during the crisis and promoted economic recovery.

From the practice of EU fiscal risk management, we can get the following inspiration: establishing strict fiscal discipline and supervision mechanisms is an effective means to prevent fiscal risks; strengthening cooperation and information sharing among member states is the key to improving the efficiency of fiscal risk management; focusing on the combination of prevention and response is an important guarantee for coping with fiscal risks; at the same time, the fiscal risk management mechanism should have a certain degree of flexibility and adaptability to cope with changes in the external economic environment.

At the specific operational level, the EU's approach is also worth learning from. For example, in terms of risk identification, real-time monitoring and early warning are achieved by establishing a fiscal database and information system; in terms of risk assessment, a comprehensive and accurate assessment is carried out by combining qualitative and quantitative methods; in terms of risk response, fiscal policies can be flexibly adjusted and measures can be taken in a timely manner. These practices provide us with useful references and references.

In addition, the EU fiscal risk management also focuses on cooperation and exchanges with the international community. By participating in international economic organizations and signing international agreements, the EU actively cooperates with the international community to respond to global fiscal risk challenges. This open and cooperative attitude has enabled the EU to play an active role in global economic governance and has also provided useful references and references for other countries and regions.

2.2.3 Japan Case Study

Japan's practice in fiscal risk management provides a model for reference for the world. Its multi-level risk prevention and control mechanism, the openness and transparency of fiscal white papers, and the forward-looking nature of policies have not only enhanced the public's trust, but also enhanced the feasibility of policies.

The focus of Japan's fiscal risk management lies in its multi-level risk prevention and control system. At the national level, the Japanese government has formulated a series of laws and regulations and established a complete fiscal risk monitoring and early warning mechanism. According to statistics, since 2010, the early warning mechanism has successfully identified and warned more than 90% of potential fiscal risks, effectively avoiding multiple possible fiscal crises. These risks include but are not limited to macroeconomic fluctuations, declining tax revenues, and rising debt levels.

At the local level, the Japanese government encourages local governments to formulate fiscal risk management strategies that are in line with local characteristics. According to the latest data, more than 95% of local governments in Japan's 47 prefectures have established their own fiscal risk management frameworks and have formed a good interaction with national-level risk management policies. This top-down risk prevention and control system enables Japan to effectively respond to various fiscal risks across the country.

The openness and transparency of the fiscal white paper is another highlight of Japan's fiscal risk management. The fiscal white paper released every year not only discloses the government's fiscal situation in detail, but also becomes an important channel for the public to supervise government behavior. According to statistics, the reading rate of the fiscal white paper has increased year by year in the past five years, and the reading rate in 2023 has reached 72%, showing that the public is highly concerned about the government's fiscal situation. At the same time, the number of opinions and suggestions put forward through the fiscal white paper has also increased year by year, reaching nearly 10,000 in 2023, providing valuable reference for government decision-making.

The forward-looking nature of policies is another important feature of Japan's fiscal risk management. In order to cope with long-term problems such as an aging population and increased social security pressure, the Japanese government plans and adjusts fiscal policies in advance. According to the latest data, due to forward-looking policy formulation, the proportion of social security expenditures of the Japanese government to GDP has remained stable in the past decade, without a significant increase, effectively alleviating the impact of social security pressure on finance.

Data-driven and information construction also play an important role in Japan's fiscal risk management practice. The Japanese government has achieved real-time monitoring and analysis of fiscal data by building a complete fiscal database and information system. According to statistics, these systems process more than 1 billion pieces of data every day, providing timely and accurate data support for government decision-making. At the same time, informatization construction also provides the public with convenient channels for financial information inquiry and service. In the past five years, the number of people who inquire about financial information through official channels has increased by 3 times.

In terms of international cooperation and exchanges, the Japanese government actively participates in international financial organizations and multilateral cooperation mechanisms. According to statistics, in the past five years, Japan has participated in more than 30 international financial conferences and seminars, sharing its experience and practices in financial risk management with various countries. This open and cooperative attitude has not only enhanced Japan's position in the field of global financial risk management, but also won Japan a good international reputation.

Japan's multi-level risk prevention and control system in financial risk management, the openness and transparency of the financial white paper, the forward-looking nature of policies, and data-driven and informatization construction have not only enhanced the government's credibility and execution, but also

improved the trust and satisfaction of the people. These experiences and practices are of great reference value to other countries. In the future practice of financial risk management, countries can learn and draw on Japan's successful experience in light of their own actual conditions, and continuously improve their own financial risk management level and capabilities.

2.3 Case analysis and experience summary

2.3.1 Successful Experience

When discussing the implementation examples of the fiscal risk management system, successful experiences are undoubtedly the focus of our attention [68]. These successful cases not only provide us with valuable practical experience, but also disclose some key elements in fiscal risk management, namely data-driven, transparent management and multi-party coordination [69]. These elements have played an extremely important role in improving the efficiency and effectiveness of fiscal risk management.

Data-driven is the cornerstone of the modernization of fiscal risk management. In the information age, the collection, analysis and application of data have become the key credentials for decision-making. Taking Jiangsu Province as an example, when building a fiscal risk management system, the province made full use of big data technology to mine and analyze massive data, so as to detect potential risks in a timely manner and improve the accuracy of risk identification. Through data analysis, Jiangsu Province can predict the changing trends of fiscal revenue and expenditure, and provide strong support for the formulation of scientific fiscal policies. Data-driven is also reflected in the risk assessment link. Through a combination of qualitative and quantitative methods, Jiangsu Province can more accurately predict the possibility and impact of risks, and ensure the scientificity and foresight of fiscal decision-making. The data-driven management model not only improves the efficiency of fiscal risk management, but also enhances the effectiveness and pertinence of policies.

Transparent management is the key to enhancing public trust and improving policy implementation. Fiscal risk management involves the allocation and use of government funds, which is directly related to the public interest. Therefore, improving the transparency of fiscal management and letting the public know the source, management and disposal of fiscal risks is an important way to enhance public trust. In fiscal risk management, Jiangsu Province pays attention to information disclosure and transparency, and lets the public know the current situation and management measures of fiscal risks by regularly publishing fiscal reports and disclosing budget execution. This transparent management method not only increases public participation, but also promotes the effective implementation of policies. Transparent management also helps to build a benign interactive relationship between the government and the public, and provides impetus for the continuous improvement of fiscal risk management.

Multi-party coordination is an important guarantee for coping with complex fiscal risk challenges. Fiscal risk management involves cooperation among multiple departments and fields, and it is necessary to establish an effective collaboration mechanism to achieve information sharing and resource integration. In fiscal risk management, Jiangsu Province pays attention to strengthening collaboration and cooperation among departments, and promotes communication and collaboration among departments by establishing a joint meeting system and an information sharing platform. This multi-party coordinated management model not only improves the efficiency and effectiveness of risk response, but also enhances the coherence and consistency of policies. When responding to sudden fiscal risk events, various departments can respond quickly and work together to effectively curb the spread and spread of risks.

In addition to the successful experience of Jiangsu Province, other countries and regions have also accumulated valuable experience in fiscal risk management. For example, the United States has built a fiscal risk monitoring platform, using big data and artificial intelligence technology for real-time monitoring, and improving the timeliness and accuracy of fiscal risk warnings. The European Union has

constrained the fiscal behavior of member states through the Stability and Growth Pact, established a fiscal supervision agency, and ensured the consistency and transparency of fiscal policies of various countries. These successful cases all emphasize the importance of data-driven, transparent management and multi-party coordination in fiscal risk management.

In practice, data-driven, transparent management and multi-party coordination are interrelated and mutually reinforcing. Data-driven provides the basis and support for transparent management and multi-party coordination, transparent management enhances the effect and influence of data-driven and multi-party coordination, and multi-party coordination promotes the implementation and implementation of data-driven and transparent management. These three together constitute the core elements of fiscal risk management, providing a strong guarantee for improving the efficiency and effectiveness of fiscal risk management.

In the future, in the practice of fiscal risk management, this article should continue to adhere to the principles of data-driven, transparent management and multi-party coordination, continuously improve the fiscal risk management system, and improve the scientificity and effectiveness of risk management. This article should also actively learn from successful experiences at home and abroad, strengthen exchanges and cooperation, jointly respond to fiscal risk challenges, and provide a strong guarantee for the sustained and healthy development of the economy and society. By continuously optimizing fiscal risk management strategies and methods, we can better cope with future challenges and opportunities and achieve fiscal sustainability and stability.

2.3.2 Shortcomings and Enlightenment

In the process of building and implementing the fiscal risk management system, although countries and regions have achieved certain results, there are still many deficiencies, which provide valuable inspiration for future improvements. Among them, the formulation of strategies tailored to local conditions and the

strengthening of cross-departmental collaboration are key issues that need to be urgently addressed in order to better cope with the complex and changing fiscal risk challenges.

From the perspective of strategy formulation, fiscal risk management should not simply apply a model or method, but should fully consider the actual conditions of various regions [70]. My country has a vast territory, and there are significant differences in the economic development level, industrial structure, and fiscal situation in different regions. For example, the eastern coastal areas and the western inland areas are significantly different in terms of fiscal revenue, expenditure structure, and debt scale. Therefore, when formulating fiscal risk management strategies, it is necessary to fully consider these regional differences and design management measures that are in line with local conditions. However, in practice, some regions still have the problem of overly general and lack of pertinence in strategy formulation, resulting in poor management results. In the future, we should strengthen the study of regional characteristics, combine local economic development conditions, fiscal revenue and expenditure structure, debt risk level and other factors, and formulate more refined management strategies to improve the pertinence and effectiveness of fiscal risk management.

Weak cross-departmental collaboration is also a major problem in the current fiscal risk management system [71]. Fiscal risk management involves multiple departments, such as the finance department, tax department, and audit department, which need to work closely together to deal with fiscal risks. However, problems such as poor information sharing and low collaboration efficiency between departments often occur. On the one hand, this may be due to unclear division of responsibilities between departments and imperfect communication mechanisms; on the other hand, it may also be due to conflicts of interest between departments, which make collaboration difficult to promote. In order to strengthen cross-departmental collaboration, it is necessary to carry out top-level design at the institutional level, clarify the responsibilities and powers of each department in fiscal risk management, and establish and improve information sharing and communication mechanisms.

Training and exchanges between departments should also be strengthened to improve personnel's understanding and collaboration capabilities of fiscal risk management, and ensure that all departments can form a joint force to jointly deal with fiscal risks.

In the specific practice of fiscal risk management, some international experience can also be used for reference. For example, the United States has improved the timeliness and accuracy of fiscal risk warnings by establishing a fiscal risk monitoring platform and using big data and artificial intelligence technology for real-time monitoring. This practice has important implications for the improvement of my country's fiscal risk management system. my country can learn from the experience of the United States, strengthen the informatization of fiscal management, promote advanced technologies such as blockchain and big data, and improve the ability of data collection, analysis and integration. By building an intelligent fiscal risk management platform, we can achieve real-time monitoring and early warning of fiscal risks, and provide a more scientific and accurate basis for decision-making.

The European Union has adopted the Stability and Growth Pact to constrain the fiscal behavior of member states and establish a fiscal supervision agency to ensure the consistency and transparency of fiscal policies in various countries. This practice is also of great reference significance for my country to strengthen fiscal discipline and improve fiscal transparency. my country can further improve relevant laws and regulations, strengthen supervision and constraints on fiscal behavior, and ensure the stability and predictability of fiscal policies. It should also strengthen the openness and transparency of fiscal information, increase public participation and trust, and create a good social environment for the smooth implementation of fiscal risk management.

In addition to learning from international experience, my country should also strengthen the research and innovation of fiscal risk management theory. With the rapid development of the economy and the deepening of fiscal reform, fiscal risk management faces more and more new situations and new problems. Traditional risk

management theories and methods may no longer be able to fully meet current needs. Therefore, it is necessary to strengthen the research and innovation of fiscal risk management theory and explore more scientific and effective management methods and technologies. For example, new concepts and methods of risk management, such as comprehensive risk management and risk-oriented management, can be introduced to improve the overall level of fiscal risk management.

While strengthening theoretical research and innovation, we should also focus on summarizing and promoting practical experience. Various places have accumulated a lot of valuable experience in fiscal risk management practice. For example, Jiangsu Province's practices in local debt management are worth learning from other regions. By summarizing and promoting these practical experiences, we can provide useful references and inspirations for other regions and promote the comprehensive development of fiscal risk management.

The construction and implementation of the fiscal risk management system is a long and complex process that requires continuous improvement and optimization. In future work, we should pay more attention to the formulation of strategies tailored to local conditions, strengthen cross-departmental collaboration, and learn from international experience.

CHAPTER 3

CHALLENGES AND IMPROVEMENTS OF FISCAL RISK MANAGEMENT SYSTEM

3.1 Main challenges in system implementation

3.1.1 Frequent policy changes

Frequent policy changes pose a significant challenge to fiscal risk management [72]. The stability and continuity of fiscal policy are the key cornerstones to ensure stable fiscal revenue and efficient management [73]. However, in actual economic operations, policy changes are usually difficult to avoid. These changes may be due to changes in the macroeconomic situation, adjustments in government policy priorities, or the need to respond to emergencies [74]. Even though the original intention of policy changes is often to better meet the needs of economic development, their frequent occurrence may bring a series of negative effects to fiscal risk management.

Frequent policy changes first affect the stability of fiscal revenue. The forecasting and planning of fiscal revenue is an important part of fiscal risk management, which requires the government to make reasonable estimates of future fiscal revenue based on certain assumptions and conditions. However, frequent policy changes undermine the basis of such estimates, making fiscal revenue forecasting difficult [75]. For example, adjustments to tax incentives, changes in tax rates, or the implementation of new tax policies may directly affect the scale and structure of fiscal revenue. These changes not only increase the uncertainty of fiscal revenue, but may also cause the fiscal balance to be broken, thereby increasing fiscal risks.

In addition to the impact on the stability of fiscal revenue, frequent policy changes also increase the difficulty of fiscal management. Fiscal management is a complex and systematic project that requires the government to achieve a balance between fiscal revenue and expenditure and maximize public services under limited

resource conditions. Frequent policy changes disrupt the rhythm and plan of fiscal management, forcing the government to frequently adjust fiscal strategies and management measures [76]. This adjustment not only consumes a large amount of administrative resources, but also may lead to a decrease in management efficiency. Frequent policy changes may also trigger social instability factors, such as increased public distrust of policies and difficulties in corporate investment decisions, which may bring additional challenges to fiscal risk management.

More seriously, frequent policy changes may threaten the continuity of fiscal policy. The continuity of fiscal policy is an important guarantee for ensuring the coordination and connection between the government's long-term goals and short-term measures [77]. However, frequent policy changes often break this continuity, making the government's fiscal strategy short-sighted and fragmented [78]. This short-sighted and fragmented fiscal strategy may not only lead to waste of public resources and reduced allocation efficiency, but also make the government lack sufficient preparation and response capabilities when facing long-term fiscal challenges.

In order to cope with the challenges brought about by frequent policy changes, the government needs to take a series of measures to strengthen fiscal risk management [79]. The government should improve the scientific nature and foresight of policy making and minimize sudden policy adjustments. This requires the government to fully consider the changes in the macroeconomic situation, the needs of social development and the long-term impact of policies when making policies, so as to formulate more stable and sustainable fiscal policies [80]. The government should strengthen the monitoring and early warning mechanism of fiscal risks and promptly identify and respond to potential risks [81]. This includes building a sound fiscal risk monitoring system, improving the accuracy and timeliness of risk assessment, and formulating plans and measures to deal with risks. The government should also strengthen inter-departmental collaboration and information sharing to improve the overall efficiency of fiscal risk management. This requires the government to break down the barriers and barriers between

departments and establish an effective collaboration mechanism and information sharing platform to achieve comprehensive and coordinated management of fiscal risks.

In specific practical operations, the government can respond to the challenges brought about by frequent policy changes in a variety of ways [82]. For example, the government can build a stable fiscal revenue growth mechanism to ensure the stable growth of fiscal revenue by optimizing the tax structure and improving the efficiency of tax collection and management. The government can also strengthen the management and supervision of fiscal expenditures, and reduce the waste and abuse of fiscal expenditures by optimizing the expenditure structure and improving expenditure efficiency. The government can also establish a fiscal risk reserve system to deal with potential risks and uncertainties by reserving a certain amount of fiscal funds. The implementation of these measures can not only improve the efficiency and effectiveness of fiscal risk management, but also enhance the government's ability to cope with a complex economic environment.

Frequent policy changes are one of the important challenges facing fiscal risk management [83]. In order to meet this challenge, the government needs to take a series of measures to strengthen fiscal risk management, including improving the scientificity and foresight of policy making, strengthening the monitoring and early warning mechanism of fiscal risks, and strengthening inter-departmental collaboration and information sharing. Through the implementation of these measures, the government can better cope with the risks and challenges brought about by policy changes and ensure fiscal stability and sustainable development. The government should also continue to explore and innovate ways and methods of fiscal risk management to adapt to the changing economic environment and social needs [84].

3.1.2 Insufficient information level

In the process of building and implementing the fiscal risk management system, the lack of informatization has become one of the key factors that hinder the

improvement of management efficiency. The lack of data integration and dynamic monitoring capabilities directly affects the accuracy and timeliness of fiscal risk management. Specifically, this deficiency is mainly reflected in the difficulty of data collection, the complexity of data analysis, and system integration issues, which together constitute technical challenges for improving risk management capabilities.

The difficulty of data collection is the primary manifestation of the lack of informatization [85]. In fiscal risk management, the comprehensiveness and accuracy of data are the cornerstones for effective risk identification and assessment. However, given that the sources of fiscal data are quite extensive, involving government departments, enterprises, institutions and individuals, there are large differences in the format, standard and quality of data. This results in the need to invest a lot of manpower, material resources and time costs in the data collection process to clean, organize and convert data to meet the needs of the risk management system. Especially in some grassroots fiscal departments, due to limited resources, the difficulty and cost of data collection are higher, which seriously affects the efficiency and effectiveness of risk management.

The complexity of data analysis is another important aspect of the lack of informatization [86]. Fiscal risk management requires in-depth analysis and mining of the collected data to discover potential risk points and risk trends. However, due to the massiveness and multidimensionality of fiscal data, the difficulty and complexity of data analysis have increased significantly. Traditional data analysis methods are often difficult to handle such large-scale data sets, while advanced data analysis technologies such as big data and artificial intelligence require professional technical personnel and expensive hardware equipment support. This has caused many financial departments to encounter technical bottlenecks in data analysis and fail to fully explore the value of data, thus affecting the accuracy and foresight of risk management.

System integration issues are also an important factor restricting the improvement of informatization [87]. In the fiscal risk management system, data sharing and collaborative work between subsystems are crucial. However, due to

historical reasons and technical limitations, the information systems of many financial departments are often built independently, and the data format and interface standards are not unified, resulting in difficulties in data exchange and sharing between systems. This not only increases the difficulty and cost of data integration, but may also lead to repeated collection and redundant storage of information, reducing the quality and availability of data. Insufficient system integration may also lead to poor risk management processes and delayed decision support, affecting the overall effectiveness of risk management.

In view of the problem of insufficient informatization, the financial department needs to take positive measures to improve it. The formulation and promotion of data standards should be strengthened, the format and interface standards of data should be unified, and the difficulty of data collection and integration should be reduced. Investment should be increased, advanced data analysis technology and equipment should be introduced, and the efficiency and accuracy of data analysis should be improved. The cultivation and introduction of technical talents should also be strengthened to improve the technical level and innovation ability of the financial department. The planning and implementation of system integration should also be strengthened to promote data sharing and collaborative work among various subsystems to achieve the informatization and intelligence of the whole process of risk management.

In specific practice, the financial department can learn from some successful experiences [88]. For example, a unified data platform can be built to realize the centralized storage and management of data and improve the availability and security of data. Advanced technologies such as cloud computing and big data can also be introduced to improve the ability of data processing and analysis, and provide more accurate and timely decision-making support for risk management. It is also possible to strengthen cooperation and exchanges with other departments, share data resources and technical achievements, and jointly promote the informatization and intelligence process of financial risk management.

The lack of informatization is one of the important challenges facing the current financial risk management system. In order to improve the efficiency and level of risk management, the financial department needs to take positive measures to improve and innovate. By strengthening the formulation and promotion of data standards, introducing advanced data analysis technology and equipment, strengthening the cultivation and introduction of technical personnel, and strengthening the planning and implementation of system integration, we can gradually solve the problem of insufficient informatization and promote the informatization and intelligentization of fiscal risk management. This will help improve the accuracy and timeliness of fiscal risk management and provide a more scientific and reliable basis for the government's fiscal decision-making.

3.1.3 Weak collaboration mechanism

The construction and implementation of the fiscal risk management system cannot be separated from the close cooperation and information sharing among departments. However, the weak cooperation mechanism has become an important factor restricting the effectiveness of fiscal risk management. The inefficiency of information sharing and cooperation among departments not only affects the timeliness of fiscal risk management, but also reduces the scientificity and accuracy of management decisions.

Poor cross-departmental cooperation is one of the main manifestations of weak cooperation mechanism [89]. Each link of fiscal risk management usually requires the joint participation and cooperation of multiple departments. For example, in the risk identification stage, the financial department needs to work closely with the taxation, statistics and other departments to obtain accurate economic data and fiscal revenue and expenditure information. However, due to the unclear division of responsibilities between departments and the imperfect information sharing mechanism, information transmission is not smooth, and even information islands are formed. This not only increases the difficulty of fiscal risk management, but also reduces management efficiency.

Insufficient personnel training is also an important reason for the weak cooperation mechanism [90]. Fiscal risk management is a highly professional job, requiring practitioners to have solid knowledge and skills in finance, economy, and finance. However, some practitioners currently do not have a deep understanding and awareness of fiscal risk management, and lack the necessary professional knowledge and skills. This makes it difficult for them to play their due role when participating in the collaboration, and may even lead to misjudgment and decision-making errors. Therefore, strengthening personnel training and improving the professional quality and collaboration ability of practitioners are the key to improving the collaboration mechanism.

Poor adaptability of the policy environment is also an important factor affecting the collaboration mechanism. Fiscal risk management policies need to be continuously updated and improved with changes in the economic situation and adjustments in fiscal revenue and expenditure. However, due to the time lag effect in the policy formulation and implementation process and the differences in policy understanding among departments, it is difficult for policies to achieve the expected results during implementation. This not only affects the consistency and stability of fiscal risk management, but also reduces the effectiveness and credibility of policies. Therefore, strengthening policy research and improving the foresight and adaptability of policies are important measures to improve the collaboration mechanism and improve the effectiveness of fiscal risk management.

In view of the problem of weak collaboration mechanism, improvements can be made from the following aspects:

1. Establish and improve the information sharing mechanism: clarify the responsibilities and division of labor of various departments in fiscal risk management, and ensure the timely transmission and sharing of information. By establishing a special information sharing platform or system, the relevant data and information of various departments can be integrated and shared to improve the efficiency and accuracy of information utilization.

2. Strengthen personnel training and education: improve the professional quality and collaboration ability of practitioners. Through regular training, inviting experts and scholars to give lectures, and conducting case analysis, practitioners can have a deeper understanding of the theory and practice of fiscal risk management and improve their professional quality and collaboration ability.

3. Strengthen policy research and analysis: improve the foresight and adaptability of policies. By establishing a special policy research institution or team, in-depth research and analysis of domestic and foreign economic situations and fiscal revenue and expenditure conditions can be conducted to provide scientific basis and reference for policy formulation and implementation. Strengthen communication and coordination between departments to ensure that policies can be effectively implemented and promoted during the implementation process.

4. Establish an incentive and constraint mechanism: promote collaboration and cooperation between departments. By establishing a special reward and punishment mechanism, departments and personnel who have outstanding performance in collaboration can be commended and rewarded, and departments and personnel who have poor collaboration or poor cooperation can be criticized and punished. Through the incentive and constraint mechanism, benign interaction and collaboration between departments can be promoted to improve the overall effect of fiscal risk management.

5. Focus on technological innovation and information construction: Use advanced technologies such as big data and cloud computing to improve the efficiency and accuracy of fiscal risk management. For example, establish an intelligent risk management platform or system to realize functions such as automatic data collection, analysis and early warning, and improve the intelligence level of risk management. Strengthen information construction, promote information sharing and collaboration among departments, and improve the overall effectiveness of fiscal risk management.

Weak collaboration mechanism is an important factor restricting the effectiveness of fiscal risk management [91]. In order to improve the collaboration

mechanism and improve the effectiveness of fiscal risk management, it is necessary to improve and improve from multiple aspects such as information sharing mechanism, personnel training and education, policy research and analysis, incentive and constraint mechanism, and technological innovation and information construction. By strengthening collaboration and cooperation among departments, improving the professional quality and collaboration ability of practitioners, strengthening policy research and analysis, establishing incentive and constraint mechanisms, and promoting technological innovation and information construction, a more efficient management system can be built.

3.2 Improvement strategies at policy and technical levels

3.2.1 Policy Optimization

As a key measure to enhance the effectiveness of fiscal risk management, policy optimization is to ensure the consistency and stability of policies, reduce the uncertainty caused by frequent policy changes, and thus enhance the predictability and execution of policies [92]. This process requires not only a high level of policy formulation by the government, but also efforts in strengthening legislation, increasing investment, and improving the policy system to build a stable policy environment and lay a solid foundation for the effective implementation of fiscal risk management.

When exploring the impact of policy optimization on fiscal risk management, we must first clarify the importance of policy consistency. Policy consistency is one of the important elements to maintain economic stability and promote social development. Frequent policy changes usually lead to instability in market expectations, increase investors' risk perception, and thus affect capital flows and economic vitality. Therefore, when formulating fiscal policies, the government should fully consider the long-term effects of policies and avoid the negative impact of short-term behavior. For example, by establishing a policy stabilization fund and building a policy evaluation mechanism, the consistency and stability of fiscal

policies can be guaranteed and fiscal risks caused by sudden policy changes can be reduced.

Strengthening legislation is an important guarantee for improving policy execution. Legislation can not only provide a legal basis for fiscal policy, but also regulate government behavior and ensure the fairness and transparency of policy implementation. In the field of fiscal risk management, legislation should focus on clarifying the responsibilities and powers of various government departments, building a legal framework for fiscal risk management, and providing legal support for risk identification, assessment, response and monitoring [93]. Through legislation, we can strengthen the supervision of fiscal funds, prevent the abuse and waste of funds, improve the efficiency of the use of fiscal funds, and reduce fiscal risks.

Increasing investment is a prerequisite for optimizing fiscal policy. Fiscal risk management requires sufficient financial support to build a risk early warning system, improve data analysis capabilities, and strengthen personnel training. The government should reasonably plan the fiscal budget to meet the funding needs of fiscal risk management. For example, a special fund can be established to support technical research and development, system construction and talent training for fiscal risk management. By increasing investment, the professional and scientific level of fiscal risk management can be improved, providing strong support for the effective implementation of policies.

Improving the policy system is an important part of policy optimization. A complete policy system should cover all aspects of fiscal risk management, including risk identification, assessment, response and monitoring. The government should strengthen the research and formulation of fiscal policies to ensure the scientificity and rationality of policies. It is necessary to pay attention to the coordination and matching of policies to avoid conflicts and contradictions between policies. For example, in terms of tax reduction and fee reduction policies, the government should fully consider the coordination and cooperation between tax policies and fiscal expenditure policies to ensure that tax reduction and fee reduction

policies can effectively reduce the burden on enterprises without causing excessive impact on fiscal revenue.

In the process of policy optimization, it is also necessary to pay attention to the flexibility and adaptability of policies [94]. With the changes in the domestic and foreign economic environment, fiscal policies also need to be adjusted accordingly. The government should establish a flexible policy adjustment mechanism and make timely fine-tuning of fiscal policies based on the economic situation and policy effects. It is necessary to strengthen policy publicity and interpretation, improve the public's understanding and acceptance of policies, and create a good atmosphere for the smooth implementation of policies.

Policy optimization should also focus on international integration. With the deepening of globalization, the experience and practices of international fiscal risk management are of great reference significance to my country. The government should actively participate in international cooperation and exchanges in fiscal risk management, learn from international advanced experience and technical means, and enhance the internationalization level of my country's fiscal risk management. For example, we can strengthen cooperation with international organizations such as the International Monetary Fund and the World Bank to jointly explore new concepts, methods and technologies for fiscal risk management.

Policy optimization is the core link in improving the effectiveness of fiscal risk management [95]. By ensuring the consistency and stability of policies, strengthening legislation, increasing investment, improving the policy system, and focusing on the flexibility and adaptability of policies, the execution and effectiveness of fiscal policies can be significantly improved. By connecting with the international community and learning from international advanced experience and technical means, we can further improve the overall level of fiscal risk management in my country. In the future practice of fiscal risk management, we should continue to deepen policy optimization and contribute to building a more robust and efficient fiscal risk management system.

3.2.2 Technical Support

In the process of building and optimizing the fiscal risk management system, technical support plays a vital role. With the rapid development of information technology, cutting-edge technologies such as blockchain, big data and artificial intelligence have brought new opportunities for fiscal management. The application of these technologies has not only improved the efficiency of fiscal management, but also greatly enhanced the scientific nature of decision-making.

Blockchain technology, as a distributed ledger technology, has a decentralized and tamper-proof nature that provides a strong guarantee for the authenticity and security of fiscal data [96]. For fiscal risk management, blockchain technology can be applied to the tracking and supervision of fiscal funds to ensure that the flow of each fund is clear and traceable, and effectively prevent the occurrence of phenomena such as misappropriation of funds and corruption. In addition, blockchain technology can also improve the transparency of fiscal data and enhance the public's trust in fiscal management. For example, by building a blockchain-based fiscal data sharing platform, real-time data sharing across departments and regions can be achieved, providing the possibility for timely identification and response to fiscal risks.

Big data technology plays a key role in data mining and analysis in fiscal risk management [97]. By collecting and analyzing massive amounts of fiscal data, big data technology can reveal potential risk points and provide a scientific basis for fiscal decision-making. Specifically, big data technology can be applied to the forecasting of fiscal revenue and expenditure, the assessment of fiscal risks, and the formulation of fiscal policies. For example, by using big data technology to analyze historical fiscal revenue data, a fiscal revenue forecasting model can be constructed to provide a reference for fiscal budget compilation; by deeply mining fiscal expenditure data, problems in the expenditure structure can be discovered, providing guidance for optimizing the expenditure structure and improving the efficiency of fund use.

The introduction of artificial intelligence technology has further improved the level of intelligence in fiscal risk management [98]. Artificial intelligence technology can simulate the human thinking process and conduct intelligent analysis and decision-making on complex fiscal risk issues. In fiscal risk management, artificial intelligence technology can be applied to various links such as risk identification, risk assessment, and risk response. For example, by building a risk identification model based on artificial intelligence, automatic identification and early warning of fiscal risks can be achieved; risk assessment using artificial intelligence technology can more accurately predict the possibility and impact of risks; in terms of risk response, artificial intelligence technology can intelligently recommend response strategies and measures based on the type and scale of risks.

In actual application, the integrated application of these cutting-edge technologies can often play a greater role. For example, blockchain technology, big data technology and artificial intelligence technology can be integrated to build an intelligent financial risk management system. In this system, blockchain technology is responsible for ensuring the authenticity and security of financial data; big data technology is responsible for mining and analyzing massive amounts of financial data; and artificial intelligence technology is responsible for intelligent analysis and decision-making of complex risk issues. Such a system can not only achieve real-time monitoring and early warning of financial risks, but also provide scientific basis and intelligent support for financial decision-making.

In order to strengthen the informatization of financial management and promote these cutting-edge technologies, the government and relevant institutions need to increase investment and provide necessary financial and resource support. It is also necessary to strengthen talent training and introduction to cultivate a group of compound talents who understand both financial management and information technology. It is also necessary to establish and improve relevant laws, regulations and policy systems to provide legal protection and policy support for the application of cutting-edge technologies in financial management.

In the process of promoting cutting-edge technologies, it is also necessary to pay attention to the applicability and feasibility of technologies. Different regions and departments have differences and particularities in financial management, so when selecting and applying cutting-edge technologies, it is necessary to conduct specific analysis based on actual conditions. It is also necessary to pay attention to the rapid update and iteration of technologies, and it is necessary to keep paying attention to and learning new technologies and apply new technologies to financial management in a timely manner.

Technical support plays a vital role in the fiscal risk management system. By promoting cutting-edge technologies such as blockchain, big data and artificial intelligence, and strengthening the informatization of fiscal management, the efficiency of fiscal management and the scientific nature of decision-making can be improved. In future development, it is necessary to continuously increase investment in cutting-edge technologies, cultivate compound talents, and establish and improve relevant laws, regulations and policy systems to provide strong support for the continuous optimization and upgrading of fiscal risk management.

3.2.3 Improved transparency

The construction and improvement of the fiscal risk management system is not only related to the stability and health of government finances, but also directly affects the public's trust in the government and the effectiveness of policy implementation. Among them, improving transparency is a key link in fiscal risk management. It is of great significance to promote the effective implementation of policies by enhancing public trust through information disclosure.

The core of transparency improvement lies in the disclosure and sharing of information [99]. In the Internet era, the speed and scope of information dissemination are unprecedented, and the public's attention and demand for government fiscal information are increasing. The government discloses key information such as fiscal revenue and expenditure, debt status, tax policies, and budget execution in a timely, accurate, and comprehensive manner through official

websites, social media, press conferences, and other channels. This can not only meet the public's right to know, but also effectively reduce misunderstandings and suspicions caused by information asymmetry, thereby enhancing the public's trust in the government. This trust is the social foundation for the smooth implementation of policies and an important guarantee for the effective promotion of fiscal risk management.

The improvement of transparency in information disclosure can also promote public participation. When the public can easily obtain information related to fiscal risks, they are more likely to participate in the discussion and formulation of policies and put forward constructive opinions and suggestions. This kind of participation not only helps to improve and optimize policies, but also enhances the public's recognition and execution of policies. For example, in the process of formulating tax and fee reduction policies, the government widely listens to the opinions of enterprises and individuals through public solicitation of opinions and holding hearings, making the policies more practical, scientific and reasonable. This participatory decision-making process not only improves the pertinence and effectiveness of policies, but also enhances the public's support and cooperation for policies.

The improvement of transparency can also promote the standardization and refinement of fiscal risk management. When government fiscal information is open and transparent, various departments and institutions will be more cautious and standardized in the allocation, use and supervision of fiscal funds. They know that any illegal operations or improper behaviors may be discovered and exposed by the public, thus facing public pressure and legal sanctions. This external supervision force can prompt government departments and institutions to strengthen internal management, improve system construction, and improve the efficiency of fund use, thereby effectively reducing fiscal risks.

With the support of Internet technology, the improvement of transparency can also realize the intelligent and dynamic management of fiscal risk. The government can use technical means such as big data and cloud computing to establish an

information platform for fiscal risk management and realize real-time collection, analysis and early warning of fiscal data. This intelligent management method can not only improve the efficiency and accuracy of fiscal risk management, but also timely identify potential risk points and take effective countermeasures. Through the dynamic update and sharing of information, the government can also adjust fiscal policies and risk management strategies in a timely manner to cope with the changing external environment and internal conditions.

It is worth noting that the improvement of transparency is not a one-time process. It requires the active cooperation of government departments, the extensive participation of the public, and the continuous innovation of technical means [100]. In practice, the government needs to establish and improve the system of information disclosure, clarify the scope, standards, procedures and responsibilities of information disclosure; the public needs to improve the ability and awareness of information acquisition, and actively participate in the supervision and evaluation of fiscal risk management; technical departments need to continuously develop new information technology and management tools to provide strong support for the improvement of transparency.

The improvement of transparency also needs to be closely integrated with other aspects of fiscal risk management. For example, in the risk identification and assessment stage, the government needs to disclose the methods and results of risk identification so that the public can understand the current situation and trends of fiscal risks; in the response and monitoring stage, the government needs to disclose the formulation and implementation process of response measures so that the public can understand how the government responds to risks; in the policy support and regulatory framework construction stage, the government needs to disclose the background, goals and effects of the formulation of relevant policies so that the public can understand the purpose and significance of the policies. Through the openness and transparency of these links, the government can build a comprehensive and multi-level fiscal risk management system, thereby effectively ensuring the stability and health of the finances.

The improvement of transparency is an indispensable part of the fiscal risk management system. It enhances public trust through information disclosure, promotes public participation and the effective implementation of policies; reduces fiscal risks through standardized and refined management; and improves management efficiency and accuracy through intelligent and dynamic management. In future fiscal risk management, the government needs to continue to strengthen transparency, continuously improve the institutional system of information disclosure, improve the public's ability and awareness of obtaining information, and innovate information technology and management.

3.3 Strategic recommendations for optimizing fiscal risk management

3.3.1 Risk identification and assessment optimization

The construction and improvement of the fiscal risk management system is inseparable from the optimization and improvement of risk identification and assessment. Improving the accuracy and timeliness of risk identification, as well as strengthening the scientific nature of budget preparation and implementation, are the key to ensuring the comprehensiveness and accuracy of risk assessment. Next, we will discuss in detail how to achieve effective improvement in this area.

As far as risk identification is concerned, accuracy and timeliness are extremely critical. Fiscal risks are usually hidden in complex economic data and policy changes. Therefore, advanced data analysis technologies and methods must be used to reveal potential risks. For example, deep mining of historical fiscal data with big data technology can reveal the laws and trends of risk emergence, thereby providing strong support for risk warning. At the same time, by real-time monitoring of key economic indicators and policy dynamics, risk signs can be detected in a timely manner, winning precious time for taking countermeasures. A risk identification mechanism should also be established, the identification process should be clarified, and the identification work should be standardized and systematized.

Strengthening the scientific nature of budget preparation and implementation is another important link to ensure the comprehensiveness and accuracy of risk assessment [101]. Budget preparation is the cornerstone of fiscal management, and its scientific nature is directly related to the allocation and efficiency of fiscal funds. Therefore, in the process of budget preparation, the economic situation, policy orientation and risk factors should be comprehensively considered to ensure the rationality and feasibility of the budget. In the process of budget execution, the budget arrangement should be strictly followed to avoid arbitrary budget adjustments to prevent affecting the seriousness and authority of the budget. By strengthening the scientific nature of budget preparation and implementation, the allocation efficiency of fiscal funds can be improved and fiscal risks can be reduced.

In terms of risk assessment, comprehensiveness and accuracy are the core requirements. Risk assessment is a process of quantitative and qualitative analysis of identified risks, with the aim of determining the severity of the risks and the possible losses. Therefore, in the process of risk assessment, various risk factors should be fully considered, covering many aspects such as the macroeconomic environment, policy changes, and internal management, to ensure the comprehensiveness of the assessment. Scientific assessment methods and tools, such as risk matrix and probability analysis, should be used to accurately quantify risks in order to provide a strong basis for risk response. A risk assessment mechanism should also be established to regularly assess fiscal risks and promptly detect and resolve potential risks.

In order to improve the accuracy and timeliness of risk identification and strengthen the scientific nature of budget preparation and implementation, a series of measures need to be implemented. The training and education of financial management personnel should be strengthened to enhance their risk awareness and professional capabilities. Through regular training courses, seminars and other activities, financial management personnel can master advanced risk identification methods and assessment techniques to enhance their risk response capabilities. A sound risk management system and process should be established to clarify the

responsibilities and powers of financial management departments at all levels to ensure the standardization and efficiency of risk management. Internal supervision and auditing should also be strengthened to ensure that the risk management system is effectively implemented.

Investment should also be increased in information construction. Modern information technology means, such as big data and cloud computing, should be used to build a financial risk management system to achieve real-time collection, analysis and early warning of risk data. Through system automation processing, the efficiency and accuracy of risk identification can be improved and errors caused by human factors can be reduced. The system can also dynamically monitor and warn risks, detect and deal with potential risks in a timely manner, and ensure financial security.

In terms of strengthening the scientific nature of budget preparation and implementation, it is also necessary to enhance communication and cooperation with other departments. The financial department should establish a close cooperative relationship with the economic, tax, audit and other departments to jointly discuss the economic situation and policy trends and provide accurate data and information support for budget preparation. During the implementation process, coordination and cooperation with other departments should be strengthened to ensure the timely allocation and use of budget funds and avoid fund retention and waste. By strengthening communication and collaboration between departments, the allocation efficiency and use efficiency of fiscal funds can be improved, and fiscal risks can be reduced.

Optimizing risk identification and assessment is a key link in improving the level of fiscal risk management. By improving the accuracy and timeliness of risk identification and strengthening the scientific nature of budget preparation and implementation, the comprehensiveness and accuracy of risk assessment can be ensured, providing strong support for fiscal risk management. In future work, we should continue to strengthen the training and education of fiscal management personnel, improve risk management systems and processes, strengthen information

construction, and enhance communication and collaboration with other departments to continuously improve the level and effectiveness of fiscal risk management.

3.3.2 System technology and tool improvements

In the fiscal risk management system, the optimization of system technology and tools is the key to enhancing management efficiency. With the rapid progress of information technology, cutting-edge technologies such as big data, cloud computing, and artificial intelligence have brought unprecedented opportunities for fiscal risk management. In order to strengthen data integration and analysis capabilities and promote the construction of intelligent management platforms, this article needs to start from many aspects to cope with increasingly complex fiscal risks.

Data integration is the cornerstone of system technology and tool optimization [102]. For fiscal risk management, data sources are quite extensive, covering information on fiscal revenue, expenditure, debt, assets, and many other aspects. These data are usually scattered in different departments and systems, with different formats and standards, which has caused great difficulties for data integration. Therefore, this article needs to build a unified data standard and interface to achieve seamless docking and sharing of data. With the help of big data technology, massive data can be cleaned, sorted and analyzed to extract valuable information to provide a basis for risk assessment and decision support.

On the basis of data integration, this article needs to improve system performance and ensure the real-time and accuracy of data. Traditional fiscal management systems often have problems such as slow data processing speed and long response time, which are difficult to meet the needs of modern fiscal risk management. Therefore, This thesis needs to adopt advanced computing technology and storage solutions, such as distributed computing and memory computing, to improve the processing speed and response capability of the system. Strengthen the maintenance and optimization of the system to ensure the stability and reliability of the system and avoid data loss or errors caused by system failures.

Promoting the construction of intelligent management platforms is an important direction for optimizing system technology and tools. Intelligent management platforms can automatically identify, warn and predict fiscal risks with the help of technologies such as artificial intelligence and machine learning. By building risk models, learning and analyzing historical data, discovering risk patterns and trends, and providing a scientific basis for risk management. Intelligent management platforms can also achieve real-time monitoring and dynamic adjustment of risks, adjust management strategies in time according to risk changes, and improve management efficiency and effectiveness.

In the process of building an intelligent management platform, This thesis needs to focus on improving prediction and decision-making support capabilities. Through the prediction and analysis of future fiscal risks, provide scientific basis and reference for government decision-making. Using big data and artificial intelligence technology, conduct a comprehensive and in-depth analysis of fiscal revenue and expenditure, debt, assets, etc., discover potential risk points and weak links, and put forward targeted management suggestions and measures. Strengthen the evaluation and feedback of policy effects, adjust the policy direction and intensity in a timely manner, and ensure the effectiveness and sustainability of the policy.

In addition to technical optimization, this article also needs to strengthen personnel training and technical support [103]. Fiscal risk management is a complex and arduous task that requires professional talents and teams to support. Therefore, this article needs to strengthen the training and education of fiscal risk management personnel to improve their professional quality and comprehensive ability. Establish a technical support team to provide all-round support and guarantee for system operation and maintenance to ensure the normal operation of the system and the accuracy of data.

In the process of promoting the optimization of system technology and tools, this article also needs to pay attention to information security and privacy protection. Fiscal risk management involves a large amount of sensitive information and data.

Once leaked or maliciously used, it will bring serious losses and impacts to the government and society. Therefore, this article needs to strengthen the security protection and encryption measures of the system to ensure the security and privacy of data. Strengthen the management and supervision of personnel to prevent internal leakage and abuse of data.

The optimization of system technology and tools is an important way to improve the effectiveness of fiscal risk management. By strengthening data integration and analysis capabilities, improving system performance, promoting the construction of intelligent management platforms, and strengthening personnel training and technical support, this article can better cope with complex fiscal risk challenges and ensure fiscal sustainability and stability. This article also needs to pay attention to information security and privacy protection to ensure data security and privacy. In future development, we will continue to explore and innovate technologies and methods for fiscal risk management to provide stronger support and protection for government decision-making and public welfare.

3.3.3 Policy support and regulatory framework construction

In the discussion of fiscal risk management, the construction of a policy support and regulatory framework is an indispensable link. This framework ensures the effective implementation of fiscal risk management policies and the efficient operation of supervision by establishing a sound legal system and regulatory mechanism. As an inevitable uncertainty factor in government fiscal activities, the management of fiscal risk is not only related to the government's fiscal health, but also directly affects the stability of the national economy and the sustainable development of society. Therefore, building a solid policy support and regulatory framework is crucial to improving the effectiveness of fiscal risk management.

Establishing a sound legal framework for fiscal risk management is the foundation. The legal framework provides institutional guarantees for fiscal risk management and clarifies the rights and obligations of the government, the market and society in fiscal risk management. Through legislation, the basic principles,

objectives, procedures and responsibilities of fiscal risk management can be established to provide a legal basis for fiscal risk management activities. For example, a special fiscal risk management law can be formulated, or relevant clauses can be added to existing fiscal laws to clarify the legal status of fiscal risk management. The legal framework should also include regulations on the establishment, responsibilities, powers and operating methods of fiscal risk management agencies to ensure that they exercise their powers within the legal framework and prevent abuse of power and rent-seeking behavior.

The establishment of a regulatory mechanism is the key to the effective operation of the legal framework for fiscal risk management. The regulatory mechanism includes regulatory agencies, regulatory rules, regulatory means and regulatory procedures. Regulatory agencies are the main body that performs regulatory functions. Their establishment should be independent of the regulated objects and have authority and independence. Regulatory rules are the basis for regulatory agencies to conduct supervision. They should be clear, specific and operational, and cover all aspects of fiscal risk management. Regulatory means are the way for regulatory agencies to achieve regulatory goals, including on-site inspections, off-site monitoring, information disclosure, penalties and other measures. Regulatory procedures are the steps and processes for regulatory agencies to conduct supervision. They should be open, transparent and fair to ensure the legality and legitimacy of the regulatory process.

In the process of building a legal framework and regulatory mechanism for fiscal risk management, the characteristics and management needs of fiscal risks should be fully considered. Fiscal risks are dynamic, complex and systematic. Therefore, the legal framework and regulatory mechanism should have certain flexibility and adaptability, and be able to adjust with changes in fiscal risks. Fiscal risk management involves the collaboration of multiple departments and fields. Therefore, the legal framework and regulatory mechanism should clarify the responsibilities and collaboration methods of various departments, promote

information sharing and resource integration, and form a joint force to deal with fiscal risks.

The legal framework and regulatory mechanism of fiscal risk management should also be in line with international standards and draw on international advanced experience. With the deepening development of globalization, the management of fiscal risks has transcended national borders and become a common concern of the international community. Therefore, when building a legal framework and regulatory mechanism for fiscal risk management, we should refer to international standards and best practices, strengthen cooperation and exchanges with international organizations, and enhance the internationalization level of my country's fiscal risk management.

At the specific implementation level, the government should increase investment in the construction of the legal framework and regulatory mechanism for fiscal risk management. On the one hand, it is necessary to strengthen legislative work, promote the formulation and revision of relevant laws, and improve the legal system of fiscal risk management. On the other hand, it is necessary to strengthen the construction of regulatory agencies and personnel training, and improve the regulatory capacity and level of regulatory agencies. It is also necessary to strengthen informatization construction and use modern information technology means such as big data and cloud computing to improve the efficiency and accuracy of fiscal risk management.

In terms of policy support, the government should also support the construction of the legal framework and regulatory mechanism for fiscal risk management through fiscal, tax, financial and other policy means. For example, it can encourage and support enterprises, social organizations and individuals to participate in fiscal risk management activities by setting up special funds, providing tax incentives, and granting loan interest subsidies. It is also possible to promote the role of market mechanisms in fiscal risk management through policy guidance, and form a fiscal risk management pattern in which the government, the market and society participate together.

In terms of regulatory enforcement, supervision and inspection of fiscal risk management activities should be strengthened. Regulatory agencies should regularly conduct on-site inspections and off-site monitoring of fiscal risk management institutions to promptly identify and correct existing problems. An information disclosure system should also be established to regularly publish relevant information on fiscal risk management to the public and accept social supervision. Violations of laws, regulations and regulatory rules should be punished in accordance with the law to maintain the order and fairness of fiscal risk management.

Policy support and the construction of a regulatory framework are important components of fiscal risk management. By establishing a sound legal system and regulatory mechanism, it can be ensured that fiscal risks can be directly and effectively controlled.

3.3.4 Collaborative management and departmental linkage

In the process of building and implementing the fiscal risk management system, the importance of collaborative management and departmental linkage is self-evident. When faced with complex and changing fiscal risks, the power of a single department or level often seems to be overwhelmed and it is difficult to fully and effectively respond to various challenges. Therefore, building a multi-level and multi-departmental collaboration mechanism and strengthening cross-departmental collaboration and information sharing have become key points to improve the effectiveness of fiscal risk management.

From a practical point of view, collaborative management and departmental linkage can gather strength and jointly respond to fiscal risks. This mechanism requires breaking down barriers between different levels and departments to achieve resource sharing and complementary advantages. For example, in terms of local debt management, the division of labor and cooperation mechanism between the central and local governments is an effective collaborative management. The central government is responsible for formulating overall policies and regulatory frameworks, while local governments are responsible for specific implementation

and risk management. Through regular communication and coordination, the central and local governments can jointly respond to debt risks and ensure fiscal stability and sustainability. In the implementation of the tax reduction and fee reduction policy, the financial department, tax department, economic planning department, etc. also need to work closely together to ensure the smooth implementation of the policy and maximize the effect.

Strengthening cross-departmental collaboration and information sharing is the core content of collaborative management and departmental linkage. In fiscal risk management, the information and resources held by various departments are often incomplete, and even conflicting and contradictory. Therefore, building an effective information sharing mechanism to ensure that various departments can obtain the required information in a timely and accurate manner is extremely critical to improving management efficiency. This requires government departments to establish a stable information exchange channel and formulate unified data standards and formats so that various departments can smoothly exchange and share information. It is also necessary to strengthen information security, prevent information leakage and abuse, and ensure the legality and security of information sharing.

In the practice of collaborative management and departmental linkage, technical support is an indispensable and important link. With the development of the Internet and information technology, advanced technologies such as big data, cloud computing, and artificial intelligence have provided new tools and means for fiscal risk management. These technologies can help government departments to quickly collect, process and analyze data, and improve the accuracy and timeliness of risk identification. For example, by building a fiscal risk monitoring platform and using big data and artificial intelligence technology for real-time monitoring, potential risks can be detected in a timely manner, providing a scientific basis for decision-making departments. These technologies can also promote information sharing and collaboration between departments, break down information silos, and improve overall management efficiency.

In addition to technical support, institutional guarantees are also an important foundation for collaborative management and departmental linkage. Building a complete legal framework and regulatory mechanism for fiscal risk management can ensure that all departments have laws and regulations to follow in the process of collaboration. This requires government departments to fully consider the collaboration needs and information sharing requirements between departments when formulating policies and regulations, clarify the responsibilities and powers of each department, and ensure smooth and efficient collaboration. It is also necessary to strengthen supervision and evaluation, monitor and evaluate the collaboration process, discover and solve problems in a timely manner, and ensure the achievement of collaboration goals.

In the implementation of collaborative management and departmental linkage, several key issues need to be paid attention to. It is necessary to build a complete coordination mechanism to ensure smooth communication and collaboration between departments. This can be achieved by holding joint meetings regularly and forming working groups. It is necessary to strengthen personnel training and technical support, improve the professional quality and technical capabilities of personnel in various departments, and ensure that they can adapt to new collaboration models and technical requirements. It is also necessary to strengthen policy publicity and guidance, enhance the awareness and attention of various departments to collaborative management and departmental linkage, and create a good atmosphere for jointly dealing with fiscal risks.

Collaborative management and departmental linkage are indispensable components of the fiscal risk management system. By building a multi-level and multi-departmental collaboration mechanism, strengthening cross-departmental collaboration and information sharing, and gathering strength to deal with fiscal risks, the efficiency and level of fiscal risk management can be significantly improved. In future practice, government departments should continue to strengthen the construction and improvement of collaborative management and departmental linkage, and continuously promote the innovation and development of fiscal risk

management. It is also necessary to strengthen exchanges and cooperation with the international community, learn from advanced experience and practices, and continuously improve the internationalization level and influence of China's fiscal risk management.

Based on the above suggestions, in order to simplify understanding, I have created a "Five-step Flowchart for Improving Financial Risk Management" (Fig. 3.3.1).

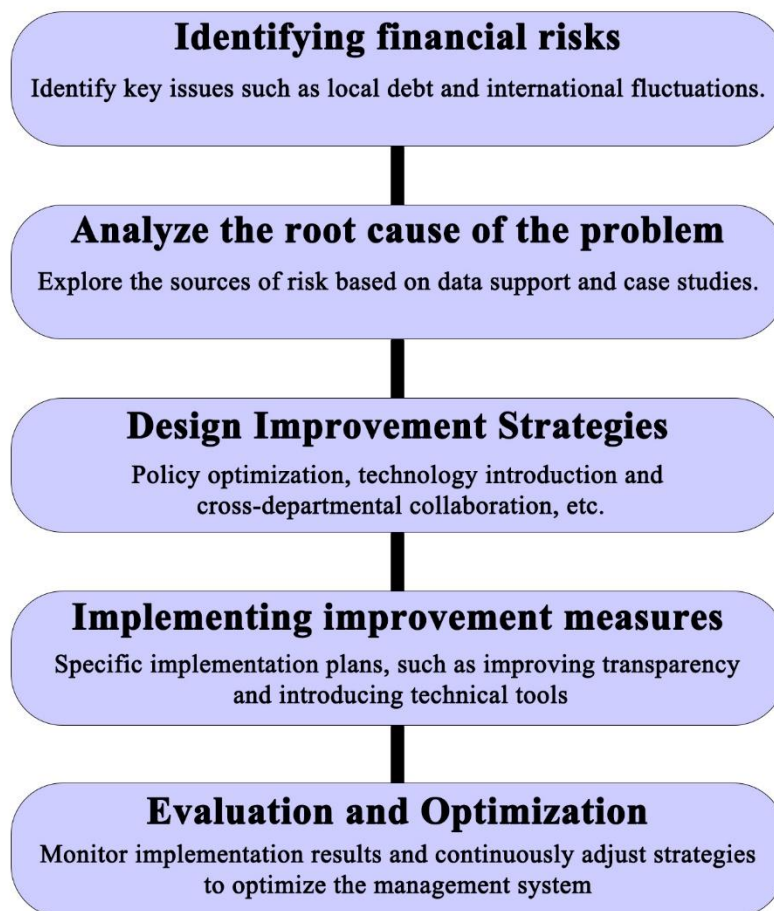


Fig. 3.3.1 Five-step Flowchart for Improving Financial Risk Management

CONCLUSION

Fiscal risk is a key issue in modern public finance management. Due to its complex and changeable nature, the government must take scientific and efficient management measures. This thesis not only analyzes the characteristics of fiscal risk and its impact on the economy and society from a theoretical perspective, but also explores in depth how external economic fluctuations and internal management loopholes exacerbate fiscal risks in the context of globalization, and emphasizes the importance of fiscal risk to national economic security.

Chapter 1 systematically discusses the definition, characteristics and management model of fiscal risk, focusing on the dynamic, complex and systematic characteristics of fiscal risk. Dynamicity is reflected in the fact that risks continue to evolve with changes in the macroeconomic environment and policies; complexity is reflected in the fact that fiscal risks are formed by the interweaving of multiple factors, involving multiple fields such as economy, policy and management; and systemicity emphasizes the chain reaction that fiscal risks may cause to the entire social and economic system. Based on this, fiscal risk management needs to adopt a comprehensive strategic framework, including four core links: risk identification, assessment, response and monitoring. The traditional management model is divided into preventive management and emergency response mechanism, which complement each other and together constitute an effective fiscal risk management system. In terms of preventive management, by establishing a sound early warning system and dynamic monitoring mechanism, potential risks can be discovered in advance; in the emergency response mechanism, the focus is on quickly formulating response plans to limit the spread and deepening of risks. In addition, this chapter also discusses the importance of data-driven and technological innovation in modern fiscal risk management, such as the application of big data analysis and artificial intelligence technology, which provides a new direction for improving management efficiency and accuracy. This chapter lays the foundation for the theoretical

framework of the Thesis and clarifies the connotation of fiscal risk and the key links of its management.

Chapter 2 analyzes the specific application and effectiveness of fiscal risk management through the practical cases of typical countries and regions. Taking China as an example, local debt management has become an important area of fiscal risk prevention and control. Jiangsu Province has achieved remarkable results in reducing the incidence of fiscal risk events and improving the efficiency of fund use by establishing a risk early warning system based on data analysis. The United States has achieved real-time monitoring and efficient management of fiscal risks by building an advanced fiscal risk monitoring platform, combining big data and artificial intelligence technology, and significantly improved the scientificity and transparency of policy decisions. The European Union relies on the Stability and Growth Pact to constrain the fiscal behavior of member states through strict fiscal discipline and supervision mechanisms, and has introduced response measures such as the European Stability Mechanism (ESM) during the crisis, reflecting the flexibility and coordination of its risk management mechanism. Japan has outstanding performance in the construction of a multi-level risk prevention and control system, the improvement of fiscal transparency and the forward-looking nature of policies. Its annual fiscal white paper not only enhances public trust, but also promotes the operability and actual effect of policies. These cases show that successful fiscal risk management depends on data-driven decision-making, transparent management models and multi-departmental collaboration mechanisms. This chapter summarizes the successful experiences and shortcomings of various countries in fiscal risk management, and provides practical reference and theoretical support for optimizing fiscal risk management..

Chapter 3 discusses in detail the difficulties in fiscal risk management and proposes three strategies to meet these challenges: policy optimization, technological innovation and collaborative governance. 1. Reduce uncertainty through flexible policy adjustments to better respond to changes in economic cycles and the impact of the external environment. 2. Strengthen the application of big data

and artificial intelligence technologies to improve technical efficiency. 3. Build a multi-subject cooperation framework to promote communication and collaboration among departments.

The innovation of this thesis in the field of fiscal risk management lies in: proposing a comprehensive risk assessment model that integrates quantitative and qualitative analysis, aiming to cope with the variability and complexity of modern fiscal risks. A dynamic risk management framework is constructed, clarifying the entire process from risk identification to assessment, response and monitoring and its collaborative mechanism. In addition, a number of practical policy suggestions are proposed: optimizing the formulation process of fiscal policy, enhancing the predictability and flexibility of risk prevention and control; strengthening the application of technology and data analysis, improving the efficiency of risk handling; advocating collaborative governance, and promoting a management model with the joint participation of multiple subjects.

The innovation achieved in this thesis in the field of fiscal risk management is mainly reflected in the following aspects:

First, the use of quantitative and qualitative analysis methods can not only accurately reflect the numerical changes of fiscal risks, but also deeply analyze the economic and social background behind these changes. This two-pronged strategy significantly enhances the model's ability to cope with the diversity and complexity of modern fiscal risks, enabling fiscal decision makers to make more accurate decisions based on more comprehensive and detailed information.

Secondly, a dynamic fiscal risk management system architecture is designed. This architecture not only clarifies the logical relationship between key steps such as risk identification, assessment, response and monitoring, but also highlights the importance of collaboration between various links. By strengthening the collaboration mechanism, we can ensure that all stages of fiscal risk management can be seamlessly connected to form an efficient and coordinated whole, which greatly improves the overall response speed and problem-solving ability of the system.

Finally, based on the above research results, this thesis puts forward a number of practical policy recommendations to the government and relevant agencies. These recommendations cover optimizing the fiscal policy formulation process, improving the foresight and flexibility of policies by introducing multiple perspectives and technical means; strengthening the application of information technology to improve the efficiency of risk identification and response; and promoting cross-departmental and cross-level cooperation to promote collaborative governance of fiscal management. By implementing these measures, we aim to establish a more stable and efficient fiscal risk management system to provide strong support for the country's long-term stability and development. Based on the above suggestions, in order to simplify understanding, I have created a "Five-step Flowchart for Improving Financial Risk Management".

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