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Original Paper

Emergency Management System Evaluation and Fiscal Policy Inspiration—Take Liaoning Province as an Example

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Abstract

Taking Liaoning province as an example, based on the evaluation of its emergency management system (EMS), this paper puts forward some suggestions on fiscal policy innovation in view of the main problems. Firstly, according to the hierarchical structure model, the evaluation system is established. The relative degree of the index is determined by the Delphi method, and the weight of the index at all levels is calculated. The evaluation factor set and evaluation grade set are constructed, and the EMS evaluation model of Liaoning province is established and evaluated by using fuzzy mathematics evaluation method. Secondly, according to the model evaluation results, four conclusions are obtained. The top three secondary indicators are Industrial Development, Policies Regulations and Fund Source, which are very important in EMS. The top three weights of the three-level indicators are the Development of Industry, Policy Formulation and Social Funds. Active fiscal policies should be formulated to use social funds to promote the development of emergency industries. Four of the second-level indicators have reached Good, and two have reached Average. Among them, the Basic Platform has the highest score, which is a positive result of EMS construction in Liaoning province. The final score of the comprehensive evaluation of the target is the low-end level in the Good grade, indicating that there is still much room for development in the construction of the system. Finally, according to the evaluation conclusion, this paper puts forward the fiscal policy innovation to support the development of EMS, including expanding the investment channels, updating the investment fund model, increasing the selection of policy tools and establishing the national emergency management fund.

Keywords

emergency management, fiscal policy, evaluation case, emergency industry, social financing

1. Introduction

This research is supported by the financial fund of Liaoning Province. The research has three meanings. The first is to understand the actual situation of emergency management system (EMS) in Liaoning Province. The second is to find out the key elements in EMS. The third is to explore effective fiscal policy to support the construction of EMS in Liaoning Province.

Emergency management system (EMS) is an important manifestation of national governance system and governance capacity. High-efficiency EMS can not only prevent and resolve major security risks, respond to and deal with various types of disasters and accidents in a timely manner, but also protect the safety of people's lives and property and maintain social stability. EMS construction in Liaoning Province has made positive progress, and the ability of disaster prevention and mitigation has been significantly enhanced. However, EMS also faces many new situations, new tasks and new challenges, and there are some specific problems, which cannot fully meet the emergency capability requirements of large and major disasters. At present, the emergency industry in Liaoning Province has the following characteristics.

First, the market demand is uncertain. The emergency industry is an industry that provides special products and services for natural disasters, accident disasters, public health events, social security events and other emergencies. It has the functions of prevention and preparation, monitoring and early warning, disposal and rescue in special periods. Most emergency products and service requirements are seasonal. Liaoning Province is a region with frequent natural disasters such as drought, high temperature, low temperature, cold wave, flood and typhoon, but these disasters are seasonal. The seasonal demand for emergency products and services leads to fluctuations in the efficiency of enterprises. Compared with non-seasonal products and services, it has more risks and affects the supply willingness of enterprises to a certain extent.

Second, the demand for some emergency products and services is sudden. The demand is high in emergency, but there is almost no demand under normal conditions, and even needs supporting equipment such as storage warehouses. There are significant differences in the demand for safety emergency products and services between the emergency market and the general market. Relying entirely on market orientation, passively waiting for or relying on the market to bear peak demand will lead to problems such as untimely emergency response or poor emergency response. To a certain extent, this has prevented enterprises from entering the emergency industry.

Third, marketization or government ordering is a choice. In emergency products and services, most of them have the attributes of public goods or quasi-public goods. On the one hand, government orders provide enterprises with market opportunities to produce emergency products and services; on the other hand, unpredictable usage and uncertain usage time have a huge impact on the production decision-making of enterprises. The market of emergency products and services has not been fully activated and released, and the development inertia is relatively stubborn.

Fourth, the emergency industry has strong cross-cutting. The products and services of the emergency industry are scattered in other industries. If it is independent to become an emergency industry, it is necessary to clarify the industrial boundary, explore the scope of the industrial chain, extend the industrial chain, and broaden the industrial chain. At present, the basic work is still in the stage of incomplete clarity. In the construction of emergency industrial parks, the transformation and upgrading of traditional industrial parks to emergency industrial parks is insufficient. Most of the emergency industrial parks are transformed from the original industrial parks. Some industrial layout and enterprise distribution in the park are not reasonable enough, and even some enterprises have some difficulties in upgrading their products and services due to the limitation of production lines. The real transformation and upgrading need to be further deepened.

Fifth, insufficient policy guidance. The universality and specificity of the emergency industry are mixed together, and there is still a lack of clear statistical standards. There are few targeted and forward-looking policy measures. There is a lack of complete, targeted and operational industrial policy guidance and action planning in the existing policies. In terms of the standard system, industry standards have not yet been fully established, and technical specifications are not yet clear. In terms of market cultivation, there is a lack of special policies and plans for the procurement, reserve, use and supplement of emergency products. In terms of fiscal and taxation finance, the guiding role of the industry guidance fund is limited, and it has failed to effectively promote industrial development.

In view of the above characteristics, it is necessary to conduct in-depth research on EMS in Liaoning Province, explore the construction of an emergency system that is compatible with the actual situation in Liaoning Province, seek better and more perfect policies, and build a new pattern of emergency management. On the basis of quantitative evaluation, this study puts forward corresponding fiscal policy suggestions for the actual situation of EMS in Liaoning Province, hoping to help solve practical problems.

2. Evaluation System and Index Weight

2.1 Evaluation System

According to the principle of hierarchical structure model, the evaluation of EMS is set as the Target Level. Ten experts were selected to score the indicators in the evaluation system. The members were independent of each other and expressed their opinions anonymously. After collecting three consecutive scoring opinions from each expert, the results were collated. After collecting three consecutive scoring opinions from each expert, the results were collated. The above process was repeated three times, and the Source of Funds, Policies and Regulations, Industrial Development, Personnel Training, Basic Platform and Public Service were finally selected as the second-level indicators. The same method was used to screen and determine the third-level indicators (Table 1).

Table 1. Evaluation Indicators

Target Level	Second-level	Three-level
	Fund Source (A_1)	Government (A_{11})
		Society (A_{12})
	Policies Regulations (A_2)	Formulation (A_{21})
		Innovation (A_{22})
		Supervision (A_{23})
	Industrial Development (A_3)	Strategy (A_{31})
		Planning (A_{32})
		Development (A_{33})
EMS(A)	Personnel Training (A_4)	Award (A_{41})
		Cultivation (A_{42})
		Introduction (A_{43})
	Basic Platform (A_5)	Network (A_{51})
		Industrial (A_{52})
		Brand ($A_{53)}$
	Public Service (A_6)	Infrastructure (A_{61})
		Employment (A_{62})
		Incentives (A_{63})

2.2 Index Relative Degree

The index relative degree was determined by Delphi method. Ten experts independently rated each indicator and expressed their opinions anonymously. After three consecutive scoring, sort out the first result. After the above three repeated operations, the index relative degree was obtained. The results of the second-level index comparison An (n=1,2, …, 6) are shown in Table 2, and the results of the third-level index comparison Any (n=1, 2, …, 6; y=1,2,3) in Table 3.

Table 2. Relative Degree of Second-level Index

	A_1	**A_2**	**A_3**	**A_4**	**A_5**	**A_6**
A_1	**1**	1/2	1	3	5	3
A_2	2	**1**	1/3	3	3	5
A_3	1	3	**1**	4	3	5
A_4	1/3	1/3	1/4	**1**	1	2
A_5	1/5	1/3	1/3	1	**1**	2
A_6	1/3	1/5	1/5	1/2	1/2	**1**

Table 3. Relative Degree of Third -level Index

	A_{11}	A_{12}			A_{41}	A_{42}	A_{43}
A_{11}	**1**	1/2	-	A_{41}	**1**	3	5
A_{12}	2	**1**	-	A_{42}	1/3	**1**	3
-	-	-	-	A_{43}	1/5	1/3	**1**
	A_{21}	A_{22}	A_{23}		A_{51}	A_{52}	A_{53}
A_{21}	**1**	5	7	A_{51}	**1**	1/4	1/5
A_{22}	1/5	**1**	1/3	A_{52}	4	**1**	1/3
A_{23}	1/7	3	**1**	A_{53}	5	3	**1**
	A_{31}	A_{32}	A_{33}		A_{61}	A_{62}	A_{63}
A_{31}	**1**	1/3	1/5	A_{61}	**1**	1/5	1/3
A_{32}	3	**1**	1/3	A_{62}	5	**1**	1
A_{33}	5	3	**1**	A_{63}	3	1	**1**

2.3 Index Weight

There are two meanings to calculate the index weight. One is to compare the importance of each index in EMS and the other is to calculate the comprehensive level of EMS status in Liaoning Province. The auxiliary software EXCEL is used to calculate the index weight by Analytic Hierarchy Process (AHP). The calculation results of the second-level index weights W_1-W_6 and the three-level index weights W_{11}-W_{66} are shown in Table 4.

Further, according to the data in Table 4, the weights of the secondary and tertiary indicators corresponding to the total target level are summarized in Table 5.

Table 4. Second-level and Three-level Index Weights

Fund Source (A_1)	**Policies Regulations (A_2)**	**Industrial Development (A_3)**	**Personnel Training (A_4)**	**Basic Platform (A_5)**	**Public Service (A_6)**
W_1=0.2355	W_2=0.2501	W_3=0.2966	W_4=0.0858	W_5=0.0843	W_6=0.0477
W_{11}=0.2857	W_{21}=0.6973	W_{31}=0.1014	W_{41}=0.6081	W_{51}=0.0921	W_{61}=0.1111
W_{12}=0.7143	W_{22}=0.0805	W_{32}=0.2905	W_{42}=0.2905	W_{52}=0.3365	W_{62}=0.5185
—	W_{23}=0.2222	W_{33}=0.6081	W_{43}=0.1014	W_{53}=0.5714	W_{63}=0.3704

Table 5. Second-level and Three-level Index Weights to the Target Level

Fund Source (A_1)	**Policies Regulations (A_2)**	**Industrial Development (A_3)**	**Personnel Training (A_4)**	**Basic Platform (A_5)**	**Public Service (A_6)**
W_1=0.2355	W_2=0.2501	W_3=0.2966	W_4=0.0858	W_5=0.0843	W_6=0.0477
a_{11}=0.0673	a_{21}=0.1744	a_{31}=0.0301	a_{41}=0.0522	a_{51}=0.0078	a_{61}=0.0053
a_{12}=0.1682	a_{22}=0.0201	a_{32}=0.0862	a_{42}=0.0249	a_{52}=0.0284	a_{62}=0.0247
__	a_{23}=0.0556	a_{33}=0.1804	a_{43}=0.0087	a_{53}=0.0482	a_{63}=0.0177

3. Evaluation Model

3.1 Evaluation Factors Set

Based on the index weight in Table 1, the EMS evaluation factor set is constructed according to the fuzzy mathematics evaluation method. The factor set corresponds to each level of the index weight, and is named U, Un (n=1,2, …, 6) and Uny (n=1,2, …, 6. y=1,2,3), as shown in Table 6.

Table 6. Evaluation Factors

Target Level	**Second-level Factors**	**Three-level Factors**
EMS(U)	Fund Source (U_1)	Government (U_{11})
		Society (U_{12})
	Policies Regulations (U_2)	Formulation (U_{21})
		Innovation (U_{22})
		Supervision (U_{23})
	Industrial Development (U_3)	Strategy (U_{31})
		Planning (U_{32})
		Development (U_{33})
	Personnel Training (U_4)	Award (U_{41})
		Cultivation (U_{42})
		Introduction (U_{43})
	Basic Platform (U_5)	Network (U_{51})
		Industrial (U_{52})
		Brand (U_{53})
	Public Service (U_6)	Infrastructure (U_{61})
		Employment (U_{62})
		Incentives (U_{63})

3.2 Evaluation Grade Set

The evaluation grade was set as 5 grades and quantified as P = {1.0,0.8,0.6,0.4,0.2}. From high to low, they were Excellent, Good, Average, Fair, and Poor. The weight vector of the evaluation factor set corresponds to the index weight. Un corresponds to Wn, denoted as Y vector, Uny corresponds to Wnx, denoted as Bn (n= 1,2,3, …, 6) vector.

Y= (0.2355, 0.2501, 0.2966, 0.0858, 0.0843, 0.0477)

B_1= (0.2857, 0.7143)

B_2= (0.6973, 0.0805, 0.2222)

B_3= (0.1014, 0.2905, 0.6081)

B_4= (0.6081, 0.2905, 0.1014)

B_5= (0.0921, 0.3365, 0.5714)

B_6= (0.1111, 0.5185, 0.3798)

3.3 Membership Degree

Ten experts were invited to score the evaluation grade m ($0 \leq m \leq 10$) for each index in an independent environment. Then calculate the membership degree R of each index. R=mij / 10, as shown in Table 7.

Table 7. Evaluation Grade

Second-level	Three-level	Excellent	Good	Average	Fair	Poor
Fund Source (R_1)	Government	0.2	0.1	0.3	0.2	0.2
	Society	0.2	0.7	0	0	0.1
Policies Regulations (R_2)	Formulation	0.2	0.4	0.2	0.2	0
	Innovation	0	0.5	0.3	0.1	0.1
	Supervision	0	0.5	0.2	0.3	0
Industrial Development (R_3)	Strategy	0.1	0.1	0.3	0.4	0.1
	Planning	0.3	0.2	0.2	0.1	0.2
	Development	0.3	0.3	0	0.2	0.2
Personnel Training (R_4)	Award	0.2	0.3	0.3	0.2	0
	Cultivation	0.2	0.3	0.4	0.1	0
	Introduction	0.2	0.2	0.1	0.2	0.3
Basic Platform (R_5)	Network	0.2	0.3	0.3	0.1	0.1
	Industrial	0.2	0.6	0.2	0	0
	Brand	0.2	0.6	0.2	0	0
Public Service (R_6)	Infrastructure	0.2	0.2	0.1	0.2	0.3
	Employment	0.2	0.2	0.1	0.2	0.3
	Incentives	0.2	0.2	0.1	0	0.5

Using the membership degree data in Table 7 the fuzzy evaluation matrix Rn is constructed as follows.

$$R_1=\begin{bmatrix} 0.2 & 0.1 & 0.3 & 0.2 & 0.2 \\ 0.2 & 0.7 & 0 & 0 & 0.1 \end{bmatrix} \quad R_2=\begin{bmatrix} 0.2 & 0.4 & 0.2 & 0.2 & 0 \\ 0.1 & 0.5 & 0.2 & 0.2 & 0 \\ 0 & 0.5 & 0.2 & 0.3 & 0 \end{bmatrix} \quad R_3=\begin{bmatrix} 0.3 & 0.3 & 0 & 0.2 & 0.2 \\ 0.3 & 0.2 & 0.2 & 0.1 & 0.2 \\ 0.1 & 0.1 & 0.3 & 0.4 & 0.1 \end{bmatrix}$$

$$R_4=\begin{bmatrix} 0.2 & 0.3 & 0.3 & 0.2 & 0 \\ 0.2 & 0.3 & 0.4 & 0.1 & 0 \\ 0.2 & 0.2 & 0.1 & 0.2 & 0.3 \end{bmatrix} \quad R_5=\begin{bmatrix} 0.2 & 0.3 & 0.3 & 0.1 & 0.1 \\ 0.2 & 0.6 & 0.2 & 0 & 0 \\ 0.2 & 0.6 & 0.2 & 0 & 0 \end{bmatrix} \quad R_6=\begin{bmatrix} 0.2 & 0.2 & 0.1 & 0.2 & 0.3 \\ 0.2 & 0.2 & 0.1 & 0.2 & 0.3 \\ 0.2 & 0.2 & 0.1 & 0 & 0.5 \end{bmatrix}$$

4. Multilevel Fuzzy Comprehensive Evaluation

4.1 Comprehensive Evaluation Vector

In order to ensure the integrity of information and the independence of index elements, the weighted average method is used to calculate step by step, and the multi-level fuzzy comprehensive evaluation is completed. The comprehensive evaluation weight vector Hn (n=1,2,3, ..., 6) is obtained by multiplying the weight vector Bn and the fuzzy matrix Rn.

$$\mathbf{H_1= B_1XR_1=(0.2857, 0.7143)}\begin{bmatrix} 0.2 & 0.1 & 0.3 & 0.2 & 0.2 \\ 0.2 & 0.7 & 0 & 0 & 0.1 \end{bmatrix}$$

= (0.2000, 0.5285, 0.0857, 0.0571, 0.1286)

$$\mathbf{H_2= B_2XR_2=(0.6973, 0.0805, 0.2222)}\begin{bmatrix} 0.2 & 0.4 & 0.2 & 0.2 & 0 \\ 0.1 & 0.5 & 0.2 & 0.2 & 0 \\ 0 & 0.5 & 0.2 & 0.3 & 0 \end{bmatrix}$$

= (0.1475, 0.4303, 0.2000, 0.2222, 0.0000)

$$\mathbf{H_3= B_3XR_3=(0.1014, 0.2905, 0.6081)}\begin{bmatrix} 0.3 & 0.3 & 0 & 0.2 & 0.2 \\ 0.3 & 0.2 & 0.2 & 0.1 & 0.2 \\ 0.1 & 0.1 & 0.3 & 0.4 & 0.1 \end{bmatrix}$$

= (0.1784, 0.1493, 0.2405, 0.2926, 0.1392)

$$\mathbf{H_4= B_4XR_4=(0.6081, 0.2905, 0.1014)}\begin{bmatrix} 0.2 & 0.3 & 0.3 & 0.2 & 0 \\ 0.2 & 0.3 & 0.4 & 0.1 & 0 \\ 0.2 & 0.2 & 0.1 & 0.2 & 0.3 \end{bmatrix}$$

= (0.2000, 0.2899, 0.3088, 0.1710, 0.0304)

$$\mathbf{H_5= B_5XR_5=(0.0921, 0.3365, 0.5714)}\begin{bmatrix} 0.2 & 0.3 & 0.3 & 0.1 & 0.1 \\ 0.2 & 0.6 & 0.2 & 0 & 0 \\ 0.2 & 0.6 & 0.2 & 0 & 0 \end{bmatrix}$$

= (0.2000, 0.5724, 0.2092, 0.0092, 0.0092)

$$\mathbf{H_6 = B_6 X R_6 = (0.1111, 0.5185, 0.3798)} \begin{bmatrix} 0.2 & 0.2 & 0.1 & 0.2 & 0.3 \\ 0.2 & 0.2 & 0.1 & 0.2 & 0.3 \\ 0.2 & 0.2 & 0.1 & 0 & 0.5 \end{bmatrix}$$

$$\mathbf{= (0.2019, 0.2019, 0.1010, 0.1260, 0.3788)}$$

The evaluation judgment matrix H is established by using the weight vector Hn.

$$H = \begin{bmatrix} 0.2000 & 0.5285 & 0.0857 & 0.0571 & 0.1286 \\ 0.1475 & 0.4303 & 0.2000 & 0.2222 & 0.0000 \\ 0.1784 & 0.1493 & 0.2405 & 0.2926 & 0.1392 \\ 0.2000 & 0.2899 & 0.3088 & 0.1710 & 0.0304 \\ 0.2000 & 0.5724 & 0.2092 & 0.0092 & 0.0092 \\ 0.2019 & 0.2019 & 0.1010 & 0.1260 & 0.3788 \end{bmatrix}$$

4.2 Evaluation of Secondary Indicators

According to the weight vector Hn and the evaluation grade vector P, the weighted average method is used to comprehensively evaluate the six indicators, which are counted as vector Mn (n=1,2,3, …,6).

$\mathbf{M_1 = H_1 \times P^T =}$ **(0.2000,0.5285,0.0857,0.0571,0.1286) ×(1.0,0.8,0.6,0.4,0.2)= 0.7228**

$\mathbf{M_2 = H_2 \times P^T =}$ **(0.1475,0.4303,0.2000,0.2222,0.0000) ×(1.0,0.8,0.6,0.4,0.2)= 0.7006**

$\mathbf{M_3 = H_3 \times P^T =}$ **(0.1784,0.1493,0.2405,0.2926,0.1392) ×(1.0,0.8,0.6,0.4,0.2)= 0.5870**

$\mathbf{M_4 = H_4 \times P^T =}$ **(0.2000,0.2899,0.3088,0.1710,0.0304) ×(1.0,0.8,0.6,0.4,0.2)= 0.6916**

$\mathbf{M_5 = H_5 \times P^T =}$ **(0.2000,0.5724,0.2092,0.0092,0.0092) ×(1.0,0.8,0.6,0.4,0.2)= 0.7889**

$\mathbf{M_6 = H_6 \times P^T =}$ **(0.2019, 0.2019,0.1009,0.1259,0.3788) ×(1.0,0.8,0.6,0.4,0.2)= 0.5501**

$$\mathbf{M_5 > M_1 > M_2 > M_4 > M_3 > M_6}$$

4.3 Evaluation of the Target Layer

The weight of the target layer is Y, which is the index weight of the Fund Source, Policies Regulations, Industrial Development, Personnel Training, Basic Platform and Public Service in the evaluation index system.

$$\mathbf{Y = (0.2355, 0.2501, 0.2966, 0.0858, 0.0843, 0.0477)}$$

F is used to represent the comprehensive evaluation vector of the target layer, which is obtained by multiplying the weight Y and the fuzzy evaluation matrix H.

$$\mathbf{F = Y \times H = (0.2355,0.2501,0.2966,0.0858,0.0843,0.0477)} \begin{bmatrix} 0.2000 & 0.5285 & 0.0857 & 0.0571 & 0.1286 \\ 0.1475 & 0.4303 & 0.2000 & 0.2222 & 0.0000 \\ 0.1784 & 0.1493 & 0.2405 & 0.2926 & 0.1392 \\ 0.2000 & 0.2899 & 0.3088 & 0.1710 & 0.0304 \\ 0.2000 & 0.5724 & 0.2092 & 0.0092 & 0.0092 \\ 0.2019 & 0.2019 & 0.1010 & 0.1260 & 0.3788 \end{bmatrix}$$

$$\mathbf{= (0.1805,0.3591,0.1905,0.1773,0.0930)}$$

According to the weight vector F and the evaluation grade vector P, the comprehensive rating Q is calculated according to the weighted average method.

$$\mathbf{Q=F\times P^T=(0.1805, 0.3591, 0.1905, 0.1773, 0.0930)\times(1.0,0.8,0.6,0.4,0.2)=0.6716}$$

According to the quantitative evaluation set P = { 1.0, 0.8 0.6 0.4 0.2 }, the comprehensive evaluation value Q∈[1,0.8) means Excellent, Q∈[0.6,0.8) means Good, Q∈[0.4,0.6) means Average, Q∈[0.2,0.4) means Fair, Q∈[0,0.2) means Poor. The comprehensive evaluation of the target layer Q=0.6716 is at a lower level of Good.

4.4 Comprehensive Evaluation Results

Conclusion 1: According to Table 4, the weight of the secondary indicators shows that in EMS, the weight of Industrial Development (W_3= 0.2966) is the largest, and the weight of Policies Regulations (W_2 = 0.2501) is larger. Both indicators are important factors in the system. They plan and guarantee the development direction of the system from a macro perspective. The weight of Fund Source (W_1 = 0.2355) is the third. Adequate funds are strong support for the development, improvement and upgrading of the system, and material guarantee for the implementation of policies. The importance of these three indicators should be taken seriously, and the opportunity to promote industrial development should be grasped.

Conclusion 2: According to Table 5, the weight of the three-level indicators shows that among the 17 three-level indicators, the weight value of Future Development in Industrial Development (a_{33} = 0.1804) is the largest, which is the macro grasp of system development and affects the overall direction of system development. The weight of Policy Formulation in Policies and Regulations (a_{21} = 0.1744) is the second, indicating the importance of policy guidance and legal system guarantee in EMS construction. The weight of Social Capital in the Funds Source (a_{12} = 0.1682) is the third. The organization and mobilization of social funds should be valued, so that it can play a more active role.

Conclusion 3: From the perspective of secondary index evaluation, Basic Platform (M_5), Funds Source (M_1), Policies Regulations (M_2) and Personnel Training (M_4) are Good in the five grades of Excellent, Good, Average, Fair and Poor. Industrial Development (M_3) and Public Service (M_6) are Average. Among them, the score of Basic Platform (M5) is the highest, which is a positive result of EMS construction in Liaoning Province for many years, and also lays a foundation for future development. However, the current overall level is not high, and further improvement is still needed.

Conclusion 4: From the comprehensive evaluation of the target, although the Q value (0.6716) has reached the Good level, it is still in the low-end level of Good. This aspect shows that the establishment of EMS in Liaoning province has made some progress, on the other hand, it also shows that there is still much work to be done in the construction of the system.

In a word, the evaluation results of EMS in Liaoning Province show that the construction and management of EMS in Liaoning Province has made positive progress, but it is not at a high level. It needs active investment and comprehensive construction to achieve a higher level. In the following work, although there is a lot to be done, the results of quantitative calculation remind that public policy

formulation, public financing and emergency industry construction should be paid enough attention to. The formulation and innovation of fiscal policy is very urgent.

5. Fiscal Policy Support EMS

The evaluation value of EMS in Liaoning Province is at the low end of the Good grade. The important factors in EMS are Policy Formulation, Funding Sources and Industry Development. Finance is an important supplier of public goods and public services. Fiscal policy can not only provide direct capital supply, but also drive social effective funds through multiplier effect, so as to realize the pulling of related industries.

5.1 Capital Investment in Dual Channels

Explore the dual path of the combination of paid and unpaid provision in the use of government funds. Free support methods include investment subsidies and loan discounts. In the field of low maturity of industrial development, if the main body with obvious driving effect is selected, the finance can give a greater degree of subsidy support. Industrial policy realizes the signal transmission function through government subsidies. Government subsidies to emerging or promising enterprises can send positive signals to the outside world to support their development, generate positive guidance for investors, and drive social capital to flow into industrial policy-oriented emergency industries. In contrast, paid support entrusts third-party professional institutions to operate, and can choose tools such as equity investment, preferred shares and convertible bonds, focusing on high-growth enterprises with better market expectations in the emergency industry.

5.2 New Model of Investment Fund

The new mode of investment fund is to support key projects in the form of tripartite cooperation among government, bank and enterprise. It is guided by government funds, participated by sub-fund clusters, and supported by project funds point-to-point. The industrial investment fund is set up by a professional investment group, and the fund is entrusted to professional institutions for operation and management. The role of the new investment model is to guide financial capital to support industrial development, drive the growth of the total investment multiplier of the project, attract the response and integration of social and financial capital, and gradually form a fund raising-investment-management-exit cycle system.

5.3 Choice of Policy Support Tools

The policy support tools can be roughly divided into two types: pre-incentive and post-incentive. Pre-incentives include project subsidies, loan discounts and participation equity in the early stage of the project. The more important significance of the early incentive is policy guidance and policy traction, which can play the multiplier leading role of financial funds while supporting financial funds. It helps enterprises to reduce costs by providing funds to support enterprises, help enterprises to use more funds for R & D innovation and production investment, and promote industrial transformation and upgrading. In contrast, post-incentives include government procurement, ordering, redemption, promotion, etc. for

key projects, as well as incentives and subsidies for projects with better economic and social benefits and greater driving effects in completed projects. The direction of government procurement should shift from traditional procurement of new technologies and new products to services, from traditional support for R & D to support market promotion. The purpose is to promote the transmission and development of the industrial chain.

5.4 National Emergency Management Fund

The purpose of setting up the emergency management fund is to improve the efficiency of financial funds, increase transparency, improve policy credibility, and realize the function of capital reservoir. The sources of emergency management funds include government grants, social donations, corporate donations and other forms, as well as fixed-mode donations and regular financing. In order to establish a stable mechanism to ensure sustainable development, the emergency management fund is raised, managed and used by specialized agencies to ensure that the fund is reasonable, transparent and efficient. The supervisory authority supervises and audits the use of the fund to ensure the transparency and legitimacy of the use of the fund. Under the normal condition, the fund maintains and increases its value through market-oriented operation, and is allocated and used in accordance with the law when emergencies occur.

References

Bernini, C., & Pellegrini, G. (2011). How are growth and productivity in private firms affected by public subsidy? Evidence from a regional policy. *Regional Science and Urban Economics, 2011*(3), 253-265. https://doi.org/10.1016/j.regsciurbeco.2011.01.005

Chen, J., & Dong, H. (2021). Research on the reform of emergency material reserve management system and legal protection in China: Guided by the overall national security concept. *Administrative Management Reform, 2021*(06), 68-74.

Feng, Q. B. (2009). The current situation and improvement countermeasures of emergency financial fund management in China. *Financial Research, 2009*(6), 12-17.

Feng, Q. B. (2020). China 's emergency financial management system reflected by the new coronavirus epidemic. *Social Governance, 2020*(12), 36-41.

Guo, X. X., & Li, Y. H. (2021). Research review of China's emergency financial management mechanism. *Accounting Research, 2021*(3), 4-9.

Huang, D. F. (2019). Construction of emergency rescue equipment system in China. *Fire Science and Technology, 2019*(1), 134-137.

Li, C. G., Li P. X., & Tan, X. L. (2003). Research on the trend and countermeasures of industrial structure adjustment and upgrading in Northeast China. *Geographical Science, 2003*(1), 7-12.

Li, N. N. (2021). Central and local collaborative governance: the rule of law approach to the division of emergency financial power and expenditure responsibility. *Local Finance Research, 2021*(9), 21-30.

Li, W. H., Liu, F., & Gu, Y. (2020) Industrial policy, government subsidy and structural transformation of equipment manufacturing industry. *Journal of Nanjing University of Finance and Economics*, *2020*(6), 35-44.

Liu, H. J., Zhang, W. Y., & Sun, X. S. (2022). Research on the fiscal policy of supporting the development of strategic emerging industries in Liaoning Province. *Liaoning Economy*, *2022*(1), 7-12.

Liu, S. X., & Zhao, J. S. (2023) In-depth construction of financial emergency management mechanism from the perspective of public risk. *Journal of Guizhou University of Finance and Economics*, *2023*(03), 1-6.

Su, M., & Wang, M. (2015). Research on fiscal expenditure policy of emergency management in China. *China Emergency Management*, *2015*(2), 10-17.

Wang, M. (2020). Analysis of the crux of the difficulty in the management of emergency financial funds in China. *Journal of Henan College of Finance & Taxation*, *2020*(5), 1-5.

Wang, Y., & Tao H. F. (2022). Emergency fiscal policy: historical evolution governance logic and debugging trend. *Journal of Zhongzhou University*, *2022*(4), 42-46.

Wang, Z. C., & Wang, M. (2020). Some thoughts on innovative emergency management fiscal policy. *China Administration*, *2020*(5), 86-90.

Xu S. H., & Xiong, Y. C. (2019). Research on the correlation mechanism between emergency fiscal expenditure management and government emergency response capacity. *Journal of North China Institute of Science and Technology*, *2019*(6), 98-104.

Xu, H. (2021). China's emergency financial funds management problems and countermeasures. *China 's Collective Economy*, *2021*(1), 26-27.

Zhang, J. (2023). Supporting the research on fiscal policy of high-tech enterprises in Liaoning. *Jiangsu Business Forum*, *2023*(6), 136-137.

Zheng, G. Q., Liu, F. Y., & Wang, S. (2023). Analysis on the construction method and path of modern emergency material support system based on the whole process of emergency disposal. *China Emergency Rescue*, *2023*(01), 50-54.