The Development of Credit Scoring Indicators for Specialized Financial Institution in Thailand

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บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อพัฒนาตัวชี้วัดสำหรับการให้คะแนนทางเครดิต (Credit scoring) ของสถาบันการเงินเฉพาะกิจไทย และประยุกต์ใช้ Credit scoring ในการวิเคราะห์ความเสี่ยงทางเครดิตของสถาบันการเงินเฉพาะกิจของไทย โดยศึกษาและวิเคราะห์ทั้งข้อมูลเชิงคุณภาพและเชิงปริมาณที่เกี่ยวข้องกับการให้คะแนนทางเครดิตจากหน่วยงานจัดระดับความน่าเชื่อถือ (Credit Rating Agency: CRA) เช่น สำนักงานบริหารหนี้สาธารณะ, TRIS Rating, S&P, Moody's และ Fitch Ratings เป็นต้น รวมถึงใช้ข้อมูลจากสถาบันการเงินเฉพาะกิจและหน่วยงานที่เกี่ยวข้องต่าง ๆ ทั้งนี้ กรอบการวิจัย ประกอบด้วยสาระสำคัญดังนี้ โครงสร้างแบบจำลอง (ความเสี่ยงด้านธุรกิจ ความเสี่ยงด้านการเงิน และความเสี่ยงด้านมหภาค) ตัวชี้วัดและค่าน้ำหนัก (100%) (ตัวชี้วัดความเสี่ยงด้านธุรกิจ (40%) (ระดับอุตสาหกรรม (50%) และระดับองค์กร (50%)) ตัวชี้วัดความเสี่ยงด้านการเงิน (40%) ได้แก่ ระดับโครงสร้างทางการเงิน (100%) และตัวชี้วัดความเสี่ยงด้านมหภาค (20%) (ระดับมหภาค (25%) ระดับความเกี่ยวข้องกับภาครัฐ (25%) และระดับกลยุทธ์การบริหารหนี้ระยะปานกลาง (50%))

สำหรับเกณฑ์การประเมินได้ใช้ข้อมูลเพื่อนำมากำหนดคะแนนทางเครดิตของสถาบันการเงินเฉพาะกิจใช้ข้อมูลในช่วงปี พ.ศ. 2552-2562 ที่ครอบคลุมช่วงวัฏจักรเศรษฐกิจไทยโดยใช้วิธีเปอร์เซนไทล์ $Pi=\frac{iN}{100}$ เพื่อแบ่งช่วงการกำหนดคะแนนทางเครดิต 1-5 (เสี่ยงที่สุด-ดีที่สุด) และแปลงคะแนนทางเครดิตเป็นระดับ

ความน่าเชื่อถือ 1-8 (หนี้ชั้นดี-หนี้สูญ) โดยใช้วิธี Linear Regression ผ่านแบบจำลอง The Z-Score Model: $Z = X_1W\alpha + X_2W\delta + X_3W\gamma + \epsilon$

ผลจากการวิจัยพบว่าการพัฒนาตัวชี้วัดและค่าน้ำหนักโดยแบ่งความเสี่ยงออกเป็นความเสี่ยงด้านธุรกิจ ความเสี่ยงด้านการเงิน และความเสี่ยงด้านมหภาค เป็นการเพิ่มประสิทธิภาพการจัดระดับความน่าเชื่อถือของสถาบันการเงินเฉพาะกิจไทยให้มีความถูกต้องและเหมาะสมกับลักษณะธุรกิจของสถาบันการเงินเฉพาะกิจมากยิ่งขึ้น ทั้งนี้ ผลของการจัดระดับความน่าเชื่อถือมีความสัมพันธ์กับความเป็นไปได้ของการผิดนัดชำระหนี้ของสถาบันการเงินเฉพาะกิจอีกด้วย อันส่งผลต่อภาพรวมของระดับและการบริหารหนี้สาธารณะของประเทศ

คำสำคัญ: คะแนนทางเครดิต สถาบันการเงินเฉพาะกิจ ระดับความน่าเชื่อถือ ความเสี่ยงทางเครดิต

Abstract

The purposes of this research were to develop credit scoring indicators for Specialized Financial Institution (SFIs) in Thailand and to apply credit scoring to credit rating and credit risk analysis for Thailand's SFIs. This research study and analyze data related to credit scoring from leading Credit Rating Agencies (CRA) such as The Public Debt Management Office (PDMO), TRIS Rating, S&P, Moody's and Fitch Ratings. To use qualitative and quantitative data from SFIs in Thailand and related entities organization. There are four main elements that the model structure (Business risk, Financial risks and Macro risks each of consists use qualitative and quantitative data. Indicators and weight values (100%) (Business risks (40%) include of 1) Industrial level (50%) and 2) Enterprise level (50%), Financial risks (40%) consist at the basic financial level (100%) and Macro risks (20%) consist of 1) Macro level (25%) 2) Government-Related Entity (GRE) level (25%) and 3) Medium-Term Debt management Strategy (MTDS) level (50%).

The evaluation criteria use time-series and panel data that cover Thailand's economic cycle from 2009 to 2019. To analyze SFIs data by using the percentile statistical method to divide credit scores 1-5 (riskiest-best) by $Pi = \frac{iN}{100}$ and convert to creditworthiness 1-8 (prime-loss) with the linear regression method by The Z-Score Model (Altman, 1968) as follows:

Model Equations: $Z = X_1W\alpha + X_2W\delta + X_3W\gamma + \epsilon$

The results of the research showed the development of indicators and weight values by dividing risk into business risks, financial risk and macro risk enhance credit rating of SFIs to be more accurate and suitable for the business characteristics of SFIs. The effect of credit rating

is also correlated with the possibility of default of SFIs and affects to the overall of the level and management of the Thailand's public debt.

Keywords: Credit scoring, Specialized financial institution, Credit rating/Creditworthiness, Credit risk

Introduction

Situations and crises in the country and global society over the past decade have directly and indirectly affect to Thailand's economy and society. Thailand is also considered a developing country that must drive the country out of the middle-income trap that is necessary to implement the most effective public monetary and fiscal policies to maximize revenue growth, employment, investment, effective public debt management and implementation policies to promote and improve well-being that quality of life, agriculture, trade and investment of the public and private sector to provide the same maximum efficiency. These elements are essential for developing the country's economy and society in accordance with the country's development goals in the short and long term as well as enable the country to face rapidly changing and diverse situations and crises, so the government is the main agency for developing and implementing policies. Therefore, needs to be managed, pushed, implemented and promote the implementation of projects in accordance with state policies in the development economic promotion and support investments under the supervision of the Ministry of Finance (MOF) through the mechanisms and duties of another government agency called " Specialized Financial Institution (SFIs)." Both SFIs that act as banks that provide both deposit and lending services and SFIs that do business to a certain extent of their mission such as lending or guaranteeing loans to specific customers but not receiving deposits from the public or in other words, SFIs can counted as state-owned enterprises (SOEs) in the field of public finance. (The State Enterprise Policy Office, 2017)

In accordance with the Public Debt Management Act B.E. 2545 and as amended, it defines the definition of state-owned enterprises (SOEs) and SFIs/public financial institutions (SFIs) as means (a) government organizations in accordance with the law on the establishment of government organizations. (b) Limited companies or public limited companies in which government-owned companies or public limited companies in which government agencies or state-owned enterprises pursuant to (a) have more than fifty percent of the total capital, (c)

limited companies or public limited companies owned by government agencies and state-owned enterprises pursuant to (a) or (b) or state-owned enterprises according to (a) and (b) have a total capital of more than fifty percent, calculated only as a proportional capital owned by government agencies (The Public Debt Management Office, 2005).

SFIs are another SOEs with specific laws established to meet state policies by implementing financial policies and measures, include providing financial services to the public sector. It also have a mission, role and an important duty to support investment and production. The provision of goods/services to the people and economy (As a producer) under conditions in which the private sector is unable to conduct financial projects or measures and can not produce such goods or services, such as financial measures for agriculture, housing, etc. Exporting and importing goods and services that support other economic sectors rather than investing for profit or returns as much as possible or an economic activity that there is a single or smaller producer will be a more efficient production, such as goods/services that require high investment is resulting in a constant cost of mass production or production that causes the average total cost to decrease that called the benefit of economies of scale (Santi & Prasopchok, 2017).

In addition to this, the main task is conducting financial projects. Financial services and financial measures improve the economy Infrastructure, goods and public services are already on behalf of SFIs. Income-expenditure management, budget, fundraising and public debt management are very involved and important to the operations of SFIs because SFIs are part of SOEs. It is necessary to use funds, budgets and loans to conduct projects and the missions of SFIs in large numbers. In the past, the Ministry of Finance (MOF) by the Public Debt Management Office (PDMO) has played a role in raising and managing public debt for 26 SOEs (7 SFIs and 19 non-SFIs) through loans to continue and guarantee/non-guaranteed loans to SOEs of the approximately 280 billion baht per year.

At the end of 2021 fiscal year, Thailand had outstanding public debt of 9,337.5 billion baht. This represents 58.3% of gross national product (GDP). Divided into government debt and government agency debt 8,210.9 billion baht that represents 87.94% of the total outstanding public debt. SOEs debt and SFIs debt (MOF Guarantee) 1,126.6 billion bath that represents 12.06% of the total outstanding public debt. It is only in the debt section of SFIs. The outstanding public debt represents the country's large and growing fiscally obligatory public debt, which is part of the increase in public debt of SFIs as part of the increase in public debt. Since 2009, PDMO has conducted a credit rating of SOEs and SFIs that MOF has secured or

continued to on-lend. Credit scoring is intended to direction, monitor and maintain the risks of SOEs and SFIs and apply the results of such credit ratings to determine the rates of guarantee and loan fees. Fees can be charged and delivered to the Treasury as revenue about 3,147.25 million baht.

Therefore, appropriate credit scoring are important and essential to assess the potential and level of trust of SOEs and SFIs to be more efficient and consistent with various situations, as well as a guideline for the consideration of lending or guaranties. Credit risk management of SOEs and SFIs reflects public debt management and fiscal discipline as a whole.

Credit risks are the operational risks of an organization relating to business and financial information, as well as the risk that unpayable loans affect creditworthiness. Credit risk is mostly at risk by financial institutions (Andrew, Til & Scott, 2002). Additionally, credit risk is a consideration of the risk of debt caused by government guarantees loans of SOEs and the private sector to implement projects based on government objectives that could put the government at risk with careful credit risk analysis, as well as effective risk ratings and measurements can reduce these risks. (Fritz, 2016). Credit risk assessment is a type of analytical process. One of the key factors and processes in the classification of customers and credit quality of financial institutions to assess current and future credit risks affecting the competitive, survival and profit conditions of financial institutions is credit scoring (Hand & Jacka, 1998). It is stated that one process of trust models is called "credit scoring" which is useful and provides a clear term for credit risk limits. (Chengcheng, Moudud & Kenneth, 2010).

Currently, credit ratings of SFIs are conducted by credit rating agencies which have advantages and disadvantages. Vary guidelines and restrictions improve credit scoring more appropriately and thoroughly. The researchers looked at the conceptual framework for how to determining indicators and weights by using PDMO's approach is primarily based on the guidelines of various trust rating agencies as well as the use of the information and opinions of SFIs and related agencies. The purpose of research are to develop indicators and weights for credit scoring of Thailand's SFIs and to apply credit scoring in credit ratings and credit risk analysis of Thailand's SFIs. The process to develop and analyze the indicators and weight values of the appropriate indicators and can reflect the suitability of continuing the loan or guarantee of the loan. The level of credit risk, operational potential and efficiency and the likelihood that SOEs may default or fail to repay debts. It can be used to set policies, management and prevention of potential damage to public debt Fiscal burdens and including a framework for maintaining the fiscal discipline of the country as a whole can continue to be carried out.

Table 1 Outstanding Public Debt from Fiscal Year 2009-2021

Unit: Billion Baht

Outstanding Public Debt	At the end of the fiscal year												
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1) Government debt	2,586.5	2,907.5	3,181.2	3,515.0	3,774.8	3,965.5	4,157.4	4,471.2	4,959.2	5,450.2	5,664.2	6,734.9	8,203.7
2) SOEs debt (Non-SFIs)	1,108.5	1,084.0	1,079.8	1,064.3	1,113.0	1,087.4	1,065.2	994.8	970.2	954.1	892.6	796.0	845.6
3) SFIs debt (government guarantee only)	208.7	117.2	157.0	352.2	541.9	626.5	542.3	500.1	426.3	367.6	335.9	309.5	281.0
4) FIDF Debt	98.2	61.5	30.5	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5) Government Agency Debt	0.0	222.2	0.00	5.7	0.8	11.5	18.4	22.3	13.6	9.0	9.1	7.9	7.2
Total	4,001.8	4,230.3	4,448.3	4,937.2	5,430.56	5,690.8	5,783.3	5,988.4	6,369.3	6,781.0	6,901.8	7,848.2	9,337.5
GDP	9,446.5	10,620.6	11,372.1	11,775.0	12,871.6	13,132.3	13,589.1	14,345.8	15,245.8	16,167.9	16,810.0	15,863.4	16,012.8
Public debt to GDP (%)	42.4	39.8	39.1	41.9	42.2	43.3	42.6	41.8	41.8	41.9	41.1	49.5	58.3
exchange rate (USD:THB)	33.5	30.4	31.2	30.8	31.5	32.5	36.5	34.9	33.5	32.6	30.8	31.8	34.1

Source: Public Debt Management Office (2021)

Research Framework

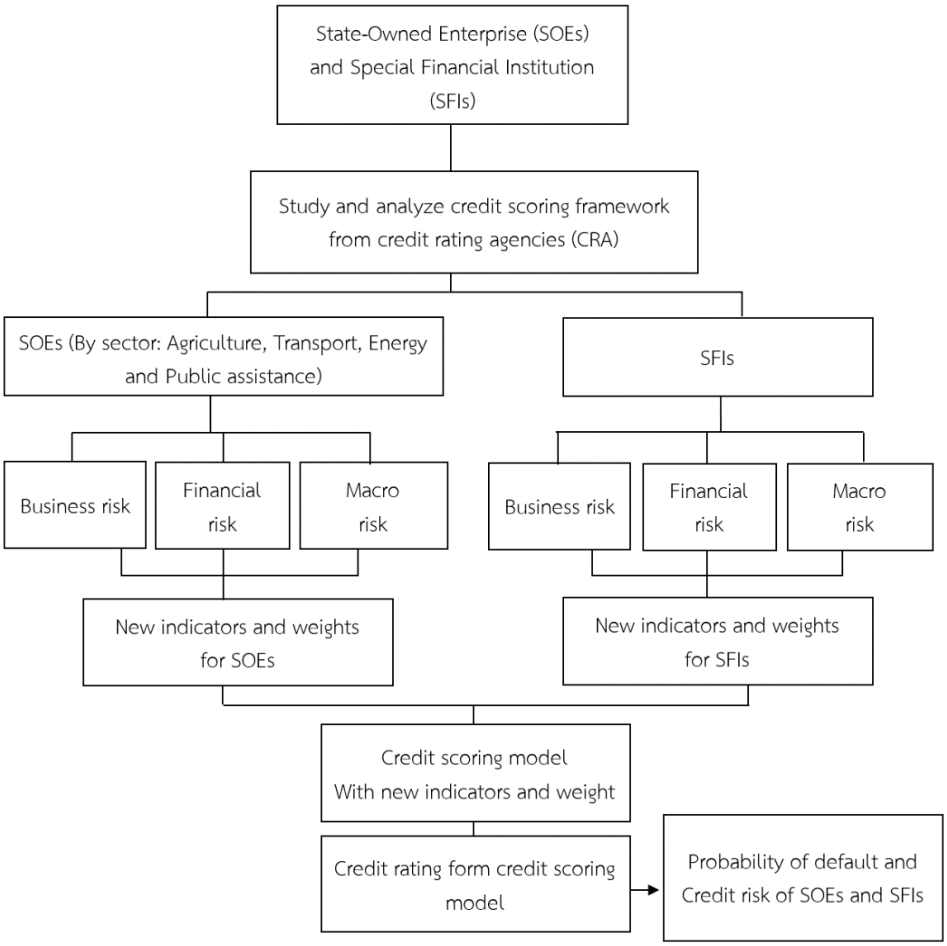

Figure 1 Framework for credit scoring of SOEs and SFIs

Source: Researcher (2021)

Methodology

This research conducted mixed method research for development of indicators and weight of credit scoring of Thailand SFIs in a sequence of steps as follows:

Population used in research

This research defines the demographics in the research divided into 1) data of 8 domestic and international CRA 2) data of 20 SOEs and SFIs and 3) data of 10 related agencies.

Research instruments

This research consists of quantitative research along with quantitative research. Using statistical techniques and economic models to analyze and determine indicators and weight values and qualitative research by interviewing officials of the PDMO and SFIs, who both do

business in the financial sector and not business in the financial sector (Budi et al., 2020), as well as studying and reviewing documents and research related to credit scoring.

Data collection

The researcher analyst and collect data from reviewing documents and research and including interviews with congressional staff and agencies involved in credit scoring, using the duration of the data collection along with quantitative research conducted by statistical analysis and economic models for approximately one fiscal year.

Data analysis

The researchers conducted a descriptive statistical analysis using statistics descriptive terms include mean, percentage and standard deviation to analyze, verifying the integrity, accuracy and consistency of data by recording data and analyzing it by computer. It relies on Microsoft Excel prefabricated programs and e-View statistics programs.

1) The data in the analysis used from 2009-2021 that cover the period of the Thailand economic cycle and use the Percentile statistical method (Figure 2) to divide the metric criteria into 5 phases to determine the credit rating criteria 1-5 (riskiest-least risky) (Table 2) taking into account the differences in distribution of data for each metric. There is a scoring criteria formula. As follows;

The formula for calculating the "Pi" position of the data is:

$$Pi = \frac{iN}{100}$$ By N is the total amount of data.

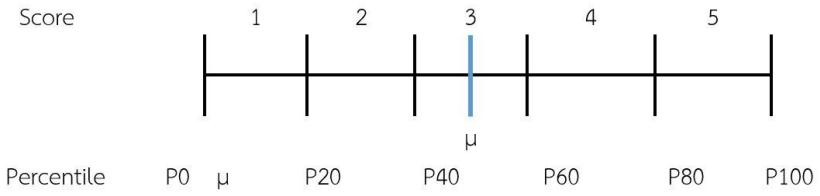

Figure 2 The concept of breaking down metric data using the Percentilestatistical method

Source: Public Debt Management Office (2021)

Table 2 Percentile Ratings

Score	Scoring Guidelines
1	Comparison data < P20
2	P20 ≤ Comparison data < P40
3	P40 ≤ Comparison data < P60
4	P60 ≤ Comparison data < P80
5	P80 ≤ Comparison data

Note: Pt is the Percentile position at t.

2) Use metric data to analyze inferential statistics analysis in the preparation of credit risk score models using simple linear regression analysis. (Simple Linear Regression) using the conceptual economic model The Z-Score Model (Altman, 1968) as follows:

Model Equations

$$Z = X_1W_{\alpha} + X_2W_{\delta} + X_3W_{\gamma} + \epsilon$$

Where Z = SFIs Credit Score

X_1 = Business Risks

X_2 = Financial Risks

X_3 = Macro Risks

W_{α} = Business Risk Weighted Score

W_{δ} = Weighted score of financial risk

W_{γ} = Macro Risk Weighted Score

ϵ = Error term

The variables in the research consist of variables based on the following SFIs credit scores and independent variables is indicators and scores of business risks, financial risks and macro risks. The percentiles in the model set the risk scores of SFIs 1–5 points that 1 referring to the highest risk level and 5 referring to the lowest risk level. Determining a risk score of 1–5 is the weighted average of the risk, each of which uses three criteria for evaluating.

2.1) Comparative period uses references of each comprehensive metric. Thailand's economic cycle changed recently since 2011-2019.
This makes it cover the highest and lowest values of the indicators.

2.2) Analytical SFIs data

2. 3) The 1–5 breakdown of each metric reflects the total credit score calculation result to a full score of 100 points to see the scores of each metric clearly and easily

understood. This score is referred to as the "Assigned Credit Score"

3) Convert 1–5 risk scores into 1–8 credit trust levels as follows: Level 1 is Highest Credit Quality Level 2 is Very High Credit Quality Level 3 is High Credit Quality Level 4 is Good Credit Quality Level 5 is Moderate Credit Quality Level 6 is Low Credit Quality Level 7 is Very Low Credit Quality and Level 8 is Lowest Credit Quality.

4)Testing the relationship between credit scoring level and the probability of default (PD) of SFIs because The Logistic Regression method affects the probability of default (Somboon, 2015) and focuses on individual agency-level analytical approaches. It relies on the analysis of regressive equations to test the relationships of variables based on dichotomous variables, which are the only two possible variables 0 and 1. Use independent variables to describe them by defining the relationship function model in logistic regression:

$$\log\left[\frac{P(k=1)}{1-P(k=1)}\right] = \alpha + \sum_{i=1}^{n} \beta i \chi i, t + \varepsilon t$$

where Pt (kt = 1) Is the probability of defaulting at t time.

Xi,t is the independent variable i at time t.

However, this is using the Logistic Regression model for the PD value of each SFIs can be estimated and analyze the ability to debt payment and key factors that configure PD, as well as monitor SFIs defaults. When analyzing regression equations using the Logistic Regression model with data on SFIs dating back over the past decade, it was found that variables that affect the probability of defaulting on SFIs include the Debt Service Coverage Ratio (DSCR), which is calculated based on earnings before interest, taxes, depreciation and amortization (EBITDA), combined with the principal and interest burdens that the government is liable to divide by the debt obligations due that year. When each independent variable increases or decreases, the probability of defaulting on SFIs increases or decreases as well as the result of which is consistent with financial theory that high credit reliability levels carry low credit risks and PD values.

Results

Research result on the development of indicators and weight values for credit scoring showed that indicators can be grouped into three areas: 1) Business risk 2) Financial risk and 3) Macro risk. The detailed indicators and weight values as follows;

1) Business risk (40%) consists:

1.1 Industrial scale (50%) consists of 1) industrial conditions that related overall (50%) 2) net credit growth across the commercial banking system (5%)

1.2 Enterprise level (50%) consists of 1) ability to manage the organization (25%) 2) corporate growth (25%) 3) competitiveness (25%) and 4) legal impact (25%)

2. Financial risk (40%) consists of basic financial level (100%)

2.1 Asset quality (25%)

2.2 Capital structure (25%)

2.3 Profitability (25%)

2.4 Liquidity (25%)

3. Macro risk (20%) consists of:

3.1 Macro level (25%) consists of 1) domestic and global economic conditions (50%) and 2) credit and financing conditions (50%)

3.2 Government Related Entity (GRE) level (25%) include 1) the relationship of SFIs with the public sector (50%) and 2) the importance of SFIs to the public sector (50%).

3.3 Medium-term debt management strategy (MTDS) (50%) (Applied from loan structure risks) Includes 1) exchange rate risk (12.5%) 2) interest rate risk (37.5%) and 3) debt restructuring risk (50%)

The findings can be summarized as shown in Figure 3 as follows:

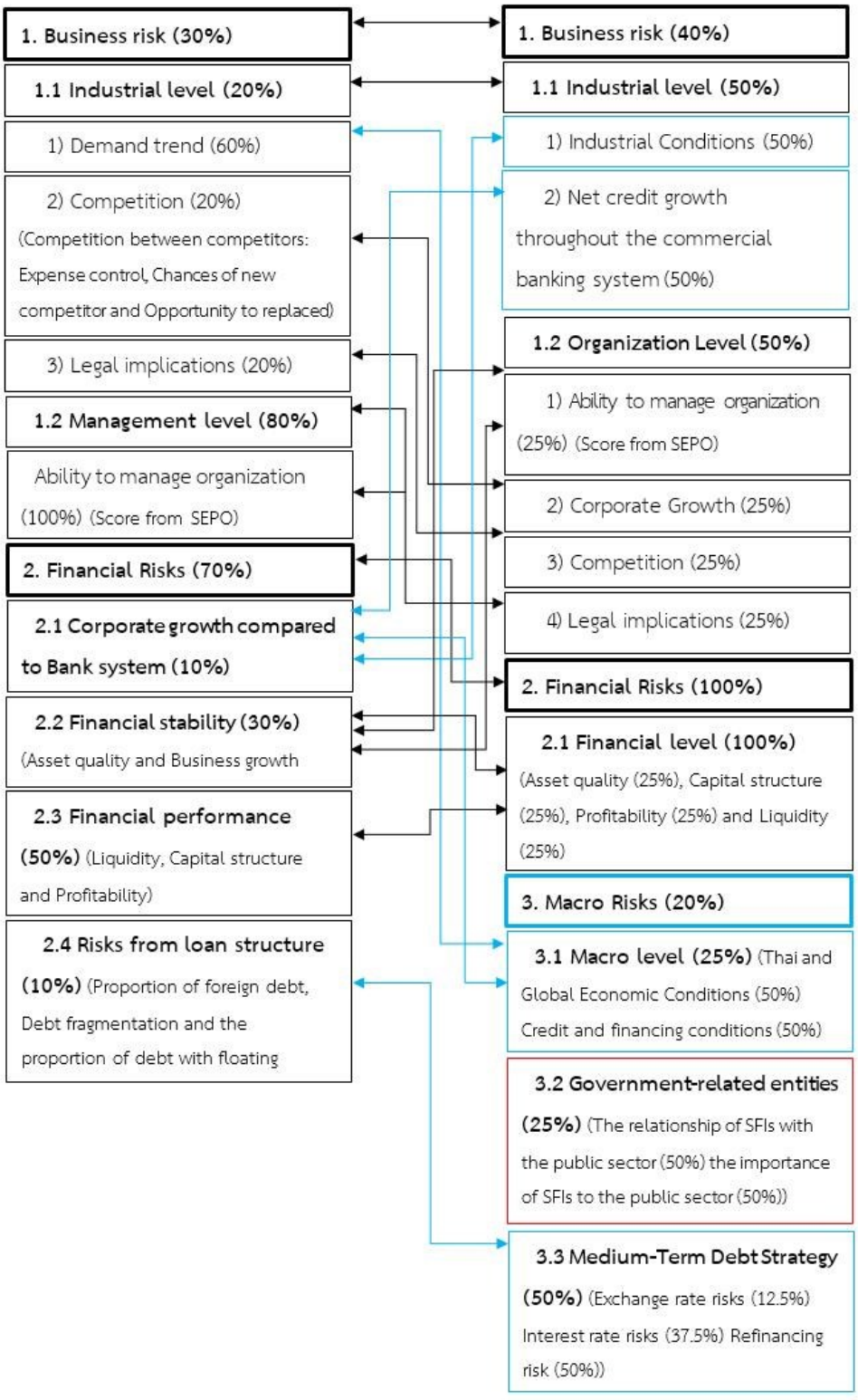

Figure 3 Summary of the structure, indicators and weight of credit scoring of SFIs

Source: Researcher (2021)

Research result analysted from determine the range of credit scores to credit rating by convert credit scores to credit ratings. The study examined the relationship between credit scores and debt repayment reflections of SFIs to determine the credit score range for each credit rating based on the level of reflection in debt repayment. As follows:

1. To use the preliminary credit score calculating data and the reflection indicators in the repayment of each SFIs namely debt service coverage ratio (DSCR) and BIS ratio divided by 8.5% (the rate set by the BOT) to see the relationship between them. The basic credit scores from models and DSCR consists;

Table 3 The relationship between the model baseline credit score and the DSCR

SFIs	New Model Before improving the score		New Model After improving the score	
	Credit Score	DSCR*	Credit Score	DSCR*
1	57.96	1.40	52.97	0.96
2	64.30	1.65	63.25	1.61
3	65.00	1.75	57.92	1.67
4	60.09	1.25	62.87	1.24

2. Take the credit score and DSCR of both the original and the study and write a scatter plot from the conceptual framework of the Z-Score Model, then cut out the atypically high DSCR data and calculate the correlation coefficient. The correlation coefficient used to see the direction of the relationship between the two variables, the Credit score and DSCR, where the correlation coefficient is between -1.0 and +1.0. Dramatically in the opposite direction if it is close to +1.0, it means that the two variables are strongly related in the same direction and if the value is 0, it means that the two variables are not related to each other. The study's 0.6022 results reflected that the model's credit score reflected reasonably well on the repayment of SFIs.

3. Analyze regression analysis to determine the linear relationship between credit score and DSCR. Set a preliminary minimum DSCR for each Credit Rating level to calculate the credit score values that correlate with the repayment reflections of sfis in each Credit Rating range using the correlation values from the equation. The regression analyzed is as follows:

DSCR* = -5.38453 + 0.122819 SCORE

T-statistics (-3.35177)*** (4.414816)*** R-squared 0.351241

F-statistic 19.4906

Adj. R-squared 0.33322 Durbin-Watson stat 2.265406

*** The coefficient is statistically significant at a 99 percent confidence level. Based on the regression equation, minimum and advanced credit scores obtained for each initial credit level. Then consider the credit rating results to numerically adjust the score range and have the appropriate interval for each credit rating in the final, with the dscr's median [(minimum+ maximum value)/2] relative to the credit score in each range.

A summary of the results of the study based on the model structure. The revised credit risk analysis model structure has improved the model by grouping the new risk analysis from the original model that divides risk analysis into two areas: quantitative analysis and qualitative analysis into three areas of risk analysis: business risk, financial risk, and macro risk. To be more in line with the credit risk assessment guidelines of leading credit rating institutions. It also reflects the risk scores in each area of SFIs, which helps more clearly reflect the performance of each aspect of SFIs. Each aspect of risk analysis consists of quantitative and qualitative indicators that grouped appropriately to the risk analysis. It has also added forward-looking data analysis for each indicator such as economic and industry trends. Reviewing financial indicators of SFIs is better reflect to risk assessments based on up-to-date information.

All of improve the model, the indicators contained in the original model have been grouped appropriately such as capital structure analysis in the enterprise-level analysis as well as new indicators to cover the risks affecting the operations of SFIs such as macroeconomic indicators and the implementation of government policies.

Discussions

Development and improvement of business risk indicators, financial risks and additionally macro risk is the development of methods and indicators of credit scoring of Thailand SFIs to be more appropriate and consistent with tasks and characteristics of SFIs. As follows;

1. Business risk is a group of key indicators that affect risk. It covers indicators ranging from external factors at the industrial level, as well as factors within the enterprise level that affect different levels. Indicators of the industrial scale indicate business conditions that are directly related to the industries in which state-owned financial institutions operate. Therefore, the indicators in this group differ from mission to mission of financial institutions, and the indicators of the enterprise level are groups of indicators that analyze the internal factors in each entity that determine the competitiveness of the organization. As well as the business performance of each financial institution. This metric group is therefore different for each financial institution. By managing the organization well, the operation and allocation of the organization's resources can be effective. It can also reduce costs and risks to contribute to better performance and performance. The organization can also grow more sustainably.

2. Financial risk is a group of indicators that determine credit risk and reflect the financial and credit stability of SFIs by indicators of the financial structure is an analysis to determine the structural proportions of capital. Loans and assets that will reflect the level of loans of SFIs profitability indicators are analyzed to determine the profitability of SFIs Indicators of liquidity are analyzed to examine the current liquidity of SFIs, which are the most important factors in short-term credit risk analysis, and asset quality indicators are analyzed to determine the ability to provide financial services or core income from assets of SFIs.

3. Macro risks is a group of indicators that further than business and financial risks. It is an important macrofactor that affects credit risk and plays an important part in the risk management of SFIs. It consists of macroeconomic indicators that a group of indicators as a whole that reflect domestic and global economic trends. Including loan and financing conditions. SFIs in the same field or economic environment have the same macroeconomic indicators. GREs are factors that reflect the implementation of government policies as SOEs have a role in implementing government policies by providing financial projects. Financial measures or financial services for economic benefits Society and Public Security, so an assessment of the relationship and importance of each SFIs to the public sector reflects the role and impact of the operations of SFIs with government-based consequences. Indicators of the medium-term

debt management strategy (MTDS), which are applied from government debt risk management which determine the proportion of debt management goals from macrofinancial indicators of SFIs that reflect costs and risks very well. It also monitors and anticipates the fiscal obligations and risk management of SFIs loans.

Conclusion and suggestions

Suggestion from research result

The development of indicators of credit scoring can be use to support the development of credit risk management of SOEs, especially the management of debt risks resulting from the guaranties and loans of the Ministry of Finance that can be carried out effectively and by adding macroindicators. In particular, indicators of the medium-term debt strategy (MTDS) were exclude and applie from loan structure indicators. It can be analyzize to cover contingent liabilities, both of explicit and implicit liabilities resulting from treasury guarantees and loans as such hidden burdens can be a burden on government debt and affect future government budget burdens and the government may have the obligation to allocate budgets to subsidize or repayment debts on behalf of SFIs. Credit risk management reduces debt fluctuations and reduces the risk of government fiscal burdens. However, this interested in credit risk management of both public and private sector organizations can apply for it.

Suggestion for the next research

1. Indicators, weight values and reliability rating results obtained from the research should be applie in the analysis compared to the current model used to classify the reliability of Thailand SFIs to know and compare the results of the credit rating of SFIs. This includes analyzing the results in conjunction with other empirical data, especially those implemented during 2020, which the COVID-19 pandemic crisis affected economies and societies around the world and including Thailand.

2. The relationship between the reliability rating results should be conside with the probability. In defaulting on SFIs through economic methods/ techniques such as Logit Regression, Pooling Methodology, etc. developed as an early warning signs for public debt and credit risk. In order for the relevant authorities able to use it, make decisions, supervise and monitor the operations and risks of SFIs closely and concretely. It can used as information to make policy decisions by executives and regulatory authorities of SFIs.

It's all Credit risk analysis and good credit rating results will help lenders and loan guarantors particularly the Ministry of Finance to determine the risk assessed and ability to repay debts of SFIs which are likely to default. To establish lending conditions and policies or continue to impose collateral fees for such SFIs If any SFIs are reliable, largely that low risk inevitably gets better lending conditions than SFIs with less reliable and high-risk levels to default on debts.

New knowledge and the effects on society and communities

The results of the research showed the development of indicators and weight values by dividing risk into business risks, financial risk and macro risk enhance credit rating of SFIs to be more accurate and suitable for the business characteristics of SFIs. The effect of credit rating is also correlated with the possibility of default of SFIs and affects to the overall of the level and management of the Thailand's public debt.

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