

Construction of Eligibility Indicators for Credit Guarantee Recipient Partners: A Case Study at Guarantee Company XYZ

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Article Info	ABSTRACT
<i>Article history:</i> Received Aug, 2026 Revised Aug, 2026 Accepted Aug, 2026 <i>Keywords:</i> Bank Financial Performance; Credit Guarantee Risk; Guarantee Partner Eligibility Indicators; K-Means Clustering; Principal Component Analysis	Indonesia's credit guarantee companies recorded asset growth from IDR 27 trillion in 2020 to IDR 46 trillion in 2024. However, the performance of the guarantee industry declined in 2024, marked by a 14.8 percent decrease in net profit, a 27.4 percent increase in net claim expenses, and a claim ratio rising to 94 percent in 2024 and 103.92 percent in February 2025, causing guarantee fee income to no longer cover claim expenses. The increase in claims was influenced by the low quality of guaranteed credit, requiring guarantee companies to evaluate bank eligibility as guarantee recipient partners based on 13 variables related to financial performance and guarantee risk, using a sample of 28 active KUR partner banks in 2024 at Guarantee Company XYZ, employing the PCA and K-Means Clustering methods. The results show that guarantee recipient partners exhibit similar characteristic patterns among certain banks, with an average CAR of 27.65 percent and NPL of 2.62 percent, along with an annual Claim Ratio trend rising sharply and simultaneously in 2024. The PCA analysis produced five principal components explaining 83.45 percent of data variance, namely Financial Performance, Guarantee Risk, Governance Vulnerability, Guarantee Intensity, and Liquidity Risk. The K-Means Clustering method confirmed this shared characteristic, producing six bank clusters with homogeneous performance profiles, categorized as Eligible (Cluster 1-4) and Ineligible (Cluster 5-6). These criteria serve as a basis for guarantee companies in selecting guarantee recipient partners, for banks in maintaining credit quality, and for the government in formulating guarantee policies that are selective and based on partner quality. <i>This is an open access article under the CC BY-SA license.</i> 
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1. INTRODUCTION Credit guarantees in Indonesia began in 1998 to support financing access for feasible but not yet bankable MSMEs through banks	and non-bank financial institutions [1]-[3]. According to the 2023 Guarantee Institution Development Report, a total of 29 guarantee companies have been established in Indonesia, consisting of 1 national
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conventional guarantee company, 18 regional conventional guarantee companies, 1 private conventional guarantee company, and 9 private sharia guarantee companies [4]. The guarantee business process is carried out through two mechanisms, namely direct guarantee and indirect guarantee, each divided into Conditional Automatic Cover (CAC), that is, guarantee without involving the guarantee company's analysis, and Case by Case (CBC), that is, guarantee involving the guarantee company's analysis. Productive credit guarantees, including KUR, mostly use the CAC scheme through banking intermediaries as guarantee recipients, so that the role of banking in maintaining credit quality is very important for the sustainability of the guarantee scheme.

The guarantee industry's assets grew from IDR 27 trillion in 2020 to IDR 46 trillion in 2024, dominated by conventional state-owned guarantee companies at 66.3 percent. However, the performance of the guarantee industry in 2024 experienced pressure, through a decrease in net profit of 14.8 percent, an increase in net claim expenses of 27.4 percent, and an increase in the claim ratio that jumped to 94 percent (up from the 73-75 percent range in 2020-2023), continuing to increase to 103.92 percent in February 2025 [4], [6]. This condition indicates that Guarantee Fee Income (IJP) is no longer able to cover the resulting claim expenses.

The increase in claims is closely related to the low quality of credit disbursed by guarantee recipient banks, reflected in the Non Performing Loan (NPL) ratio of MSME credit approaching the 5 percent threshold, reaching 4.04 percent in the second quarter of 2024 [7]. Yoshino and Taghizadeh-Hesary [8] showed that banks tend to reduce their incentive to monitor the health of credit that has been guaranteed by the guarantee company. If problem credit is not controlled, it will increase liquidity risk for the guarantee company. In accordance with OJK Regulation Number 3/POJK.05/2017 concerning Good Corporate Governance for Guarantee Institutions [9], guarantee companies need to implement risk management by identifying,

assessing, and monitoring guarantee business risk on an ongoing basis. Guarantee Company XYZ, as a conventional guarantee company, has implemented an eligibility analysis of banks as prospective guarantee recipients, but the current assessment process is still descriptive and not yet standardized among business analysts. This causes a number of partners to have very high claim ratios. In accordance with OJK Regulation Number 28 of 2025 concerning the Implementation of Risk Management for Insurance Companies, Guarantee Companies, and Pension Funds, periodic evaluation of the suitability of risk assessment methods is needed, so that the evaluation of guarantee recipient eligibility criteria at Guarantee Company XYZ becomes relevant and important to carry out.

This study aims to analyze the performance condition of guarantee recipient partners at Guarantee Company XYZ and formulate bank eligibility criteria as guarantee recipient partners, using the Principal Component Analysis (PCA) and K-Means Clustering approaches based on financial performance, governance, ownership type, and guarantee activity and risk variables.

2. LITERATURE REVIEW

Credit guarantee is an activity of providing guarantees by a guarantee company to banking for credit disbursed to debtors with limited collateral. Credit guarantee involves 3 (three) parties, namely the Guaranteed (debtor), the Guarantee Recipient (bank), and the Guarantee Company [3]. Yoshino and Taghizadeh-Hesary [8] showed that banking tends to reduce its incentive to monitor the health of credit guaranteed by the guarantee company, thereby potentially increasing the frequency of claims that must be paid by the guarantee company. This condition is in line with the OJK regulator's provisions, which establish the claim ratio as a measure of guarantee company performance; the higher the claim ratio, the worse the guarantee company's performance in carrying out its guarantee business activities [10]. Guarantee recipient eligibility is assessed through financial

performance indicators, in accordance with the research of Purbadasuha and Prasetyono [11], which analyzed the effect of CAR, BOPO, and NPL on ROA with NIM as a mediator, while Siringoringo [12] found that NPL varies according to bank ownership type. This study chose the K-Means Clustering method because it produces clear eligibility categories and has been used in bank grouping research in Indonesia [13] as well as the non-bank financial sector [14]. The K-Means Clustering method is less optimal when applied directly to highly correlated variables because it can distort the calculation of distance between objects, so dimension reduction is first needed through the Principal Component Analysis (PCA) method. The PCA method transforms mutually correlated initial variables into linearly independent principal components while retaining data information [15], [16].

3. METHODS

3.1 Data

The data used in this study is banking data obtained from Bank Indonesia, the Financial Services Authority (OJK), and Guarantee Company XYZ with a data period of 2020 to 2024. The data used amounted to 28 banks. The data criteria used are 1) the bank is classified as a Conventional Commercial Bank, 2) is an active guarantee recipient partner in 2024 at Guarantee Company XYZ, 3) the bank's financial statements can be accessed and published. The variables used consist of banking performance, ownership type, and guarantee portfolio, with details in accordance with Table 1.

3.2 Data Analysis Procedure

The data analysis procedure in this study is as follows:

1. Collecting data, including CAR, NPL, LDR, ROA, NIM, and GCG data from the 2024 Banking Annual Report, bank ownership type data from Bank Indonesia, as well as Active Production, Active Claim, Claim Ratio, and Default Rate data from Guarantee Company XYZ.
2. Performing data preprocessing, including transforming categorical variable data into numerical variables. Subsequently, standardizing numerical data using z-score.
3. Conducting data exploration to determine the characteristic condition of guarantee recipient performance.
4. Performing variable reduction into several principal components forming bank eligibility criteria using the Principal Component Analysis (PCA) method. The number of principal components is determined with the criterion of eigenvalue greater than 1. If the eigenvalue is greater than 1, then the resulting principal component is able to explain data variability better than the original variable [17], [15]. Next, determining the interpretation of each principal component, with the criterion of factor loading value greater than 0.6. The larger the factor loading value of an original variable towards the principal component, the greater its contribution in forming the principal component.
5. Clustering banks based on the principal component criteria formed in stage 4, with the following stages: (a) determining the optimal number of clusters using the Elbow method, namely observing the point on the Within Sum of Squares (WSS) graph where the decrease in value begins to level off; (b) forming clusters with the K-Means Clustering method, with Euclidean distance as the measure of similarity between banks, initiating the number of clusters used in accordance with the results at stage (a); (c) calculating clustering accuracy using the Silhouette coefficient, with a criterion of -1 to 1, where the closer

the coefficient is to -1 or 1, the better the clusters formed [18]; (d) evaluating the clustering by comparing the accuracy of several variations in the number of clusters. Determination of the clusters formed is based on a high Silhouette coefficient and clustering appropriate to eligibility identification needs.

6. Determining cluster characteristics based on the deviation of the mean value from the population mean, with positive values categorized as High and negative values categorized as Low.
7. Determining eligibility indicators and categories, Eligible and Ineligible, for guarantee recipient partners.

Table 1. Research Variables

Variable	Variable Name
X1	Ownership Type BUMN
X2	Ownership Type BPD
X3	Good Corporate Governance (GCG)
X4	Capital Adequacy Ratio (CAR)
X5	Non Performing Loan (NPL)
X6	Loan to Deposit Ratio (LDR)
X7	Return on Asset (ROA)
X8	Net Interest Margin (NIM)
X9	Operating Expense to Operating Income (BOPO)
X10	Active Production
X11	Active Claim
X12	Claim Ratio
X13	Default Rate

Source: Research data

4. RESULTS AND DISCUSSION

4.1 Performance Condition of Guarantee Recipients at Guarantee Company XYZ

The performance condition of guarantee recipient partners shows quite wide variation across all variables. The average CAR value is 27.65 percent, above the banking industry average of 26.69 percent. This indicates relatively strong capitalization. Strong capitalization indicates a stable bank condition, in accordance with the findings of Abou-El-Sood [19], stating that banks with capital adequacy ratios below a certain threshold have a significant association with bank failure, and vice versa. The average NPL value is 2.62 percent, slightly above the banking industry average of 2.08 percent, with one extreme outlier of 9.06 percent at

a BUSN bank, indicating credit concentration in high-risk commercial sectors.

The average LDR value is 88.47 percent, slightly below the banking industry average of 88.57 percent. The average ROA value is 1.74 percent, below the banking industry average of 2.69 percent, with one extreme negative outlier of -7.55 percent indicating a bank experiencing a loss. The average NIM is 5.52 percent, exceeding the industry average of 4.62 percent without outliers. Meanwhile, the average BOPO is 81.74 percent, slightly above the industry average of 81.20 percent, with one extreme outlier of 192.58 percent indicating operational inefficiency in the bank concerned.

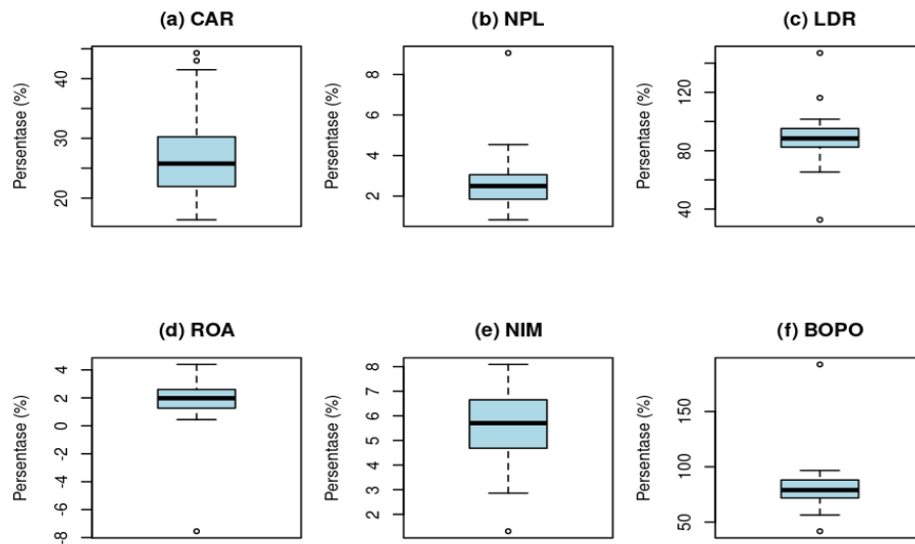


Figure. 2. Distribution of CAR, NPL, LDR, ROA, NIM, and BOPO of Guarantee Recipient Partners, 2024

Figure 3 shows the distribution of governance implementation among guarantee recipient partners, with 11 percent of partners rated Very Sound, 75 percent Sound, and 14 percent Fairly Sound, without a Less Sound or Unsound rating. The ownership type composition is dominated by BPD at 64 percent, followed by BUSN at 22 percent, and BUMN at 14 percent, where the entire national BUMN bank population has been recorded as a partner despite having the lowest proportion. This difference in characteristics between ownership types is consistent with the findings of Novaliana et al. [20] that bank ownership structure is related to banking financial performance in general, while Hamdillah

et al. [21] found that privately owned banks (BUSN) tend to be more vulnerable during crisis periods. BUMN and BPD banks, as government-owned institutions, generally also carry the mandate of distributing government programme credit such as KUR, PEN, and FLPP, so that they potentially have a different risk profile compared to BUSN, whose products are mostly commercially oriented. Figure 4 shows that 85.7 percent of partners are active in producing guarantees and 78.6 percent are active in filing claims consecutively over the last 5 (five) years. Consistency of bank involvement in the guarantee process is needed by the guarantee company to maintain the sustainability of its business.

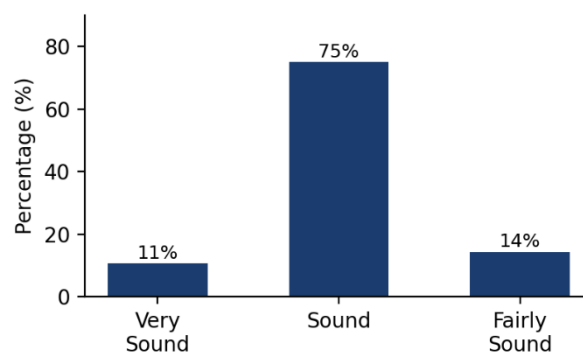


Figure 3. Distribution of GCG Rating of Guarantee Recipient Partners in 2024

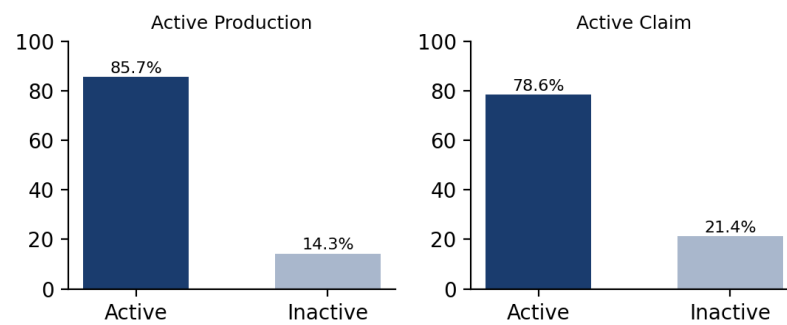


Figure 4. Distribution of Guarantee Activity of Guarantee Recipient Partners in 2024
Source: research data processing results

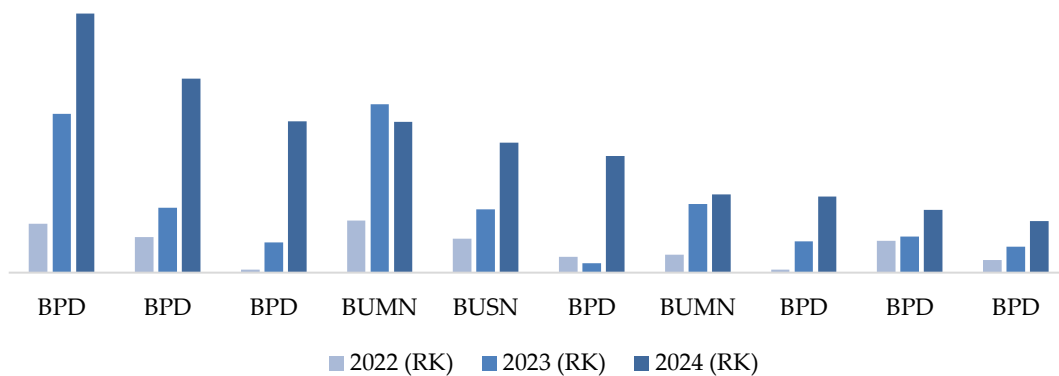


Figure 5. Claim Ratio Trend of Guarantee Recipient Partners for 2022-2024

Figure 5 shows that there is a pattern of increasing claim ratio over 3 consecutive years from 2022, and there is a spike in increase in 2024. This indicates that the nature of guarantee risk is progressive and delayed (lag effect), reflecting the decline in credit quality in the previous period. This spike was also caused by coinciding with the end of the Covid-19 credit restructuring stimulus, which was officially discontinued by OJK in March 2024.

4.2 Guarantee Recipient Eligibility Criteria

The thirteen variables were reduced through PCA into five principal components (eigenvalue > 1) explaining 83.454 percent of data variance. Principal Component 1 (Financial Performance) groups NPL and BOPO in a negative direction (factor loading -0.871 and -0.909) and ROA and NIM in a positive direction

(0.953 and 0.825), in accordance with Cahyani et al. [22] who found that CAR, LDR, and NIM simultaneously affect ROA. Principal Component 2 (Guarantee Risk) groups Default Rate and Claim Ratio with high factor loadings (0.952 and 0.941), showing that both almost entirely form this dimension. Principal Component 3 (Governance Vulnerability) groups BUMN and BPD ownership types and GCG, with opposing factor loading directions between BUMN (-0.833) and BPD (0.757), showing that the two ownership types are at different poles on this dimension. Principal Component 4 (Guarantee Intensity) is dominated by Active Production and Active Claim, while Principal Component 5 (Liquidity Risk) is dominated by LDR (factor loading 0.827), forming a separate liquidity risk dimension, distinct from the financial

performance dimension in Principal Component 1.

The five principal components were subsequently used as input data for the K-Means Clustering grouping method, producing six optimal clusters with a Silhouette coefficient ratio of 0.411

and a Between Sum of Squares/Total Sum of Squares of 78.3 percent, indicating fairly good clustering quality. Each cluster was interpreted and categorized based on the deviation of the mean value from the population mean (High or Low category), in accordance with Table 2.

Table 2. Cluster Criteria

Cluster	Financial Performance	Guarantee Risk	Governance Vulnerability	Guarantee Intensity	Liquidity Risk
1	High	Low	High	Low	Low
2	High	High*	High	High	High
3	Low*	Low	Low	Low	High**
4	Low*	Low	Low	High	Low
5	Low**	Low	High	High	High
6	Low	High**	Low	Low	Low

Description: *) the difference between the cluster mean and the population mean is below 0.1, ***) extreme value

Clusters 1 and 2 show a High pattern in Financial Performance and Low in Guarantee Risk, indicating good financial performance accompanied by controlled guarantee risk exposure. Clusters 3 and 4 show a Low pattern in Financial Performance, but the difference from the population mean is below 0.1, so it does not indicate substantially poor performance. Meanwhile, Clusters 5 and

6 each show an extreme Low value in Financial Performance and High in Guarantee Risk, forming the basis for categorization as Ineligible. It is thus obtained that Clusters 1 to 4 meet the sound threshold according to regulation so that they are appropriately categorized as Eligible, while Clusters 5 and 6 do not meet this threshold so that they are appropriately categorized as Ineligible.

Table 3. Eligibility Criteria of Guarantee Recipient Partners

Eligible Category	Cluster	NPL	BOPO	ROA	NIM	DR	RK
Eligible	1	2.20	77.33	1.77	5.41	0.66	16.15
	2	2.43	77.96	2.18	6.03	6.53	200.12
	3	2.50	83.20	1.80	7.10	0.00	0.00
	4	2.27	70.70	2.67	4.71	4.39	121.09
Ineligible	5	9.06	192.58	-7.55	1.31	0.00	0.00
	6	3.22	96.68	0.44	4.44	238.80	4,484.34

Source: research data processing results

The Eligible category bank (Clusters 1-4) has an NPL of 2.20 percent to 2.50 percent, far below the maximum threshold of 5 percent. This cluster has a BOPO of 70.70 percent to 83.20 percent, classified as efficient to fairly efficient. The ROA of this cluster is 1.77 percent to 2.67 percent, exceeding the threshold of 1.5 percent for the very sound category. The NIM of this cluster is 4.71 to 7.10 percent, exceeding the threshold of 3

percent for the very sound category. The Default Rate value is 0 to 6.53 percent and the Claim Ratio is 0 to 200.12 percent. There is one BPD guarantee recipient partner that has a very high Claim Ratio reaching 2,234.33 percent, but is still maintained in the Eligible category because the bank's financial performance shows good performance.

The Ineligible category bank (Clusters 5-6) has an NPL of 3.22 to 9.06

percent, with Cluster 5 exceeding the maximum threshold. This is in accordance with the research of Khoiriyah and Dailibas [23] which found that NPL has a negative effect on bank profitability. The BOPO of this cluster is 96.68 percent to 192.58 percent, exceeding the unsound threshold. ROA ranges from -7.55 percent to 0.44 percent, below the sound threshold, including one cluster with negative ROA. The Default Rate value is 238.80 percent and the Claim Ratio is 4,484.34 percent, far exceeding the Eligible cluster. This cluster consists entirely of BUSN banks, with two different conditions, namely Cluster 6 showing a very high Claim Ratio but relatively maintained financial performance in NPL and BOPO, while Cluster 5 shows a Claim Ratio and Default Rate of 0 percent in 2024 but very low financial performance on other criteria, indicating potential pressure in the following period although it has not yet been reflected in the current year's claims.

4.3 Managerial Implications

Guarantee Company XYZ needs to implement a more selective and standardized partner selection referring to Table 6, with cooperation priorities directed at Cluster 1-4 banks, while Clusters 5-6 require special attention. Considering the progressive nature of guarantee risk identified in Table 3, eligibility evaluation is recommended not only to be done once at the beginning of the cooperation, but to be monitored periodically to detect potential category shifts as early as possible, in line with Usanti and Setiawati [24] who emphasized the importance of continuous monitoring in the MSME credit guarantee scheme. Banking as a guarantee recipient partner is advised to maintain the quality of the credit disbursed, especially KUR credit, so that the NPL and Claim Ratio remain within regulatory thresholds, considering that declining credit quality directly contributes to an increase in the claim burden borne by the Guarantee

Company. The government and the Financial Services Authority can utilize the results of this research as input in designing a more selective and partner-quality-based credit guarantee policy, considering that performance characteristics and guarantee risk are not uniform across bank ownership types; strengthening governance and risk management at banks with high risk profiles needs to continue to be encouraged to mitigate moral hazard risk in the distribution of guaranteed credit [8].

5. CONCLUSION

This research answers two research questions. First, the performance condition of guarantee recipient partners in 2024 varies widely across all observed variables, but shows a similar characteristic pattern among a number of banks, not entirely unique from one another; the annual Claim Ratio trend increased sharply and simultaneously in 2024 after being stable in 2022-2023, indicating a progressive guarantee risk that potentially may not be detected early if the evaluation is only based on financial conditions at one point in time. Second, the eligibility determinants of guarantee recipient partners are determined by two main components with the largest variance, namely Financial Performance (NPL, BOPO, ROA, NIM) and Guarantee Risk (Default Rate, Claim Ratio), together with three other components (Governance Vulnerability, Guarantee Intensity, Liquidity Risk), forming the basis for K-Means Clustering which produces six clusters with relatively homogeneous performance profiles within their groups, categorized as Eligible (Clusters 1-4) and Ineligible (Clusters 5-6) referring to official OJK provisions. Banks with better financial performance consistently show lower guarantee risk, confirming the relationship between performance condition and guarantee recipient eligibility criteria. Overall, partner eligibility can be assessed systematically based on the type or character

of the group, not merely evaluated as unique individual entities.

Based on this conclusion, for future research it is recommended to develop eligibility criteria based on time series data, and to consider adding observation periods and other research variables, in order to accommodate the speed of guarantee risk escalation identified in this study.

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