Climate Risk Issue on Credit Loans Decisions to Rural Society

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Abstract. Building a sustainable economy for rural areas must be based on good public literacy of the surrounding natural conditions. Therefore, it needs to formulate recommendations for lending decisions so that the economic resilience of rural communities remains good when natural disasters occur due to climate change. This study uses descriptive analysis, a decision tree model, and interviews as a basis for analyzing to get the right decisions for financial service providers in providing credit loans to certain economic sectors in West Java rural communities. The novelty of this research is able to explain the disaster risk index in the village which can be taken into consideration in the process of making credit decisions by financial service providers. Therefore, the value of credit restructuring due to natural disasters can be minimized and not become a loss so that it does not become an obstacle to the economic resilience of rural communities.

Keywords: Climate Risk Issue-1; Credit Loans Decisions-2; Rural Society-3; Financial Service Provider-4; Credit Restructurisation-5

1 Introduction

In the current context in a developing country like Indonesia, development must start from the village to ensure inclusive development. The economy in the village is the backbone of the real sector, so the resilience of business actors in the village must be prioritized. However, as is well known, Indonesia is a country that is quite prone to natural disasters due to climate change [1]. Problems occur when a disaster occurs, the community becomes difficult because they have almost nothing, even just to survive daily. Efforts to restore businesses were hampered because loans to financial service providers needed asset guarantees, while their assets were exhausted by the disaster.

There are no previous studies that have discussed the need for climate risk issues that cause disasters to be used as a basis for consideration for lenders. The education process is very important for both lenders and borrowers of funds [2], both of which must be educated which types of businesses are allowed and which are not based on the assessment of the disaster risk index at the business location.

West Java is one of the provinces in Indonesia whose territory is quite often affected by natural disasters. The velocity of money in West Java is among the highest in Indonesia, then West Java is also the basis for assessing the success of the Indonesian government's stimulant program in the form of People's Business Credit which helps businesses affected by natural disasters. It based on the data released by Bank Indonesia.

ICEMBA 2022, December 17, Tanjungpinang, Indonesia

DOI 10.4108/eai.17-12-2022.2333236

This study, empirically clearly has a very significant contribution to the world of knowledge, in particular includes a new variable in the form of consideration of the issue of natural disaster risk due to climate change for the decision-making process of providing credit loans by financial service providers to rural communities.

2 Literature Review

The characteristics of business for rural society are indeed very identical, which generally are low cost innovation and their ability to produce low cost products [3]. Then, furthermore, another study conducted indicates the character of business in rural society which has elements of market heterogeneity, sociopolitical governance, chronic shortage of resources, unbranded competition, and inadequate infrastructure [4]. Issues of affordability and accessibility to a wider market are also highlighted in rural areas [5]–[8], and standardization advantages [9]. These previous studies then have implications for the preparation of an appropriate pattern of economic resilience for rural communities in emerging markets as is the case in Indonesia.

Hassan and Renteria-Guerrero (1997) explain the importance of elements of skill, use of technology, and promotional ability to support creditworthiness [10]. The case study in China also explains the need for lenders to pay attention to the level of education and skills in order to be bankable [20]. Those elements presented in the previous study serve as reinforcement for the preparation of important elements in determining creditworthiness in rural society in West Java Province. Another element that needs to be considered as an element of creditworthiness assessment is the method used. One of them is through data mining which can be used as input in the decision tree model for credit assessment [11]. This process capability can also classify the lenders as performing or non-performing loans risk, of course, besides that, it can also be used to establish a credit risk assessment model of personal to personal peer-to-peer (P2P) network lending [12]. The use of decision trees is also to anticipate challenges in the big data environment [13].

3 Data and Methodology

This study uses three stages of data processing, including three stages, 1) a description of the effect of the disaster risk index on the amount of credit disbursement growth in economic sectors that are prone to being affected, 2) a description of the effectiveness of the relaxation policy by comparing the consistency of the two parties (borrowers and lenders) in sector coverage. acceptable economic conditions, and 3) compiling a simulation model for the implementation of lending and borrowing that complies with the disaster-prone risk index.

4 Result and Discussion

Obtaining secondary data related to the disaster risk index in West Java Province obtained from the 2020 Indonesia Disaster Risk Index Report released by the National Disaster Management Agency is as presented in Table 2. It was recorded that only three districts, namely Bandung, Banjar City, and Sukabumi City, had consistent index scores in the last five years.

Table 1. West Java Province Risk Index Score From 2015 to 2020

District/City	2015	2016	2017	2018	2019	2020	Classification
Bandung Regency	174.00	174.00	174.00	174.00	174.00	174.00	High
Banjar City	152.80	152.80	152.80	152.80	152.80	152.80	High
Sukabumi City	114.40	114.40	114.40	114.40	114.40	114.40	Medium

In 2020, based on data quoted from the https://data.jabarprov.go.id/id link regarding the proportion of credit in rural society, it stands at 19.41%, growing 2.61% since 2015. Credit in West Java Province still does not pay attention to the element of the disaster risk index. This is evidenced by the observed NPL incidence of agricultural credit increasing from 9.53% to 9.78% due to crop failure due to the long dry season in 2019, when the nominal credit that slid into this sector reached 9.47 trillion rupiah (Source: Report Economy of West Java Province November 2019).

Table 2. Comparison of disasters that occurred in 2018, credit restructuring in 2018, and credit applications in Bandung Regency, Banjar City, and Sukabumi City in 2019

No	Note	Month	District/City		
			Bandung Regency	Banjar City	Sukabumi City
1	**Type of Disaster (2018)**		Flood, Landslide, Drought, and Fire	Flash floods, landslides, hurricanes	Extreme weather, Landslides, fires, earthquakes, hurricanes, floods
2	**Credit Restructurisation*) (2018)**	January	4.412.066.242.355	47.073.717.408	117.360.824.851
		February	4.483.596.342.314	47.446.155.587	124.994.829.107
		March	4.595.100.837.731	49.100.782.617	130.338.012.460
		April	4.533.074.587.844	48.458.498.349	131.684.044.847
		May	4.562.880.787.774	50.736.963.395	129.546.194.086
		June	4.378.135.035.539	51.077.285.459	125.337.753.865
		July	4.069.734.666.907	52.882.279.454	141.382.268.471
		August	3.998.508.102.524	53.209.224.257	152.311.019.914
		September	4.026.311.686.160	55.566.573.169	156.014.376.002
		October	4.121.529.282.261	51.913.511.318	176.312.948.002
		November	4.166.349.271.339	56.723.439.587	180.939.811.961
		December	4.029.347.564.128	57.417.538.436	161.999.100.990
3	**Non Performing Loan*) (2018)**	January	3.813.413.490.396	44.380.321.035	104.871.159.342
		February	3.874.998.060.890	52.510.600.703	114.088.031.936
		March	3.968.229.192.035	46.091.172.130	118.886.416.016
		April	3.944.165.110.610	47.513.159.867	123.276.424.082
		May	3.946.243.974.318	50.870.610.483	135.495.058.153
		June	3.917.350.991.118	47.795.887.120	133.784.650.547
		July	3.686.773.750.632	46.956.459.629	151.185.527.110
		August	3.630.369.381.890	48.866.628.903	159.820.564.533
		September	3.485.762.282.513	50.674.617.771	147.385.088.784
		October	3.474.923.022.753	38.383.746.335	137.979.245.850
		November	3.452.441.115.613	39.789.163.861	155.486.233.499
		December	3.331.165.706.478	34.657.322.246	243.753.121.362
4	**Credit Application**** **2019**	January	60.061.641.748.978	2.887.862.915.868	4.657.352.816.237
		February	60.667.711.823.163	2.968.988.673.262	4.481.107.434.266
		March	60.671.291.992.187	3.022.591.537.472	4.563.021.026.240

No	Note	Month	District/City		
			Bandung Regency	Banjar City	Sukabumi City
		April	60.666.474.361.921	3.103.172.403.757	4.630.354.149.827
		May	61.388.315.127.593	3.177.644.033.224	4.636.965.322.676
		June	60.968.683.419.305	3.218.195.686.333	4.653.203.370.692
		July	60.495.147.197.981	3.284.784.978.889	4.522.189.626.266
		August	61.042.098.592.084	3.353.676.413.736	4.511.696.080.307
		September	59.137.758.750.569	3.401.443.936.953	4.628.485.650.533
		October	59.697.963.512.578	3.443.726.946.778	4.596.071.808.549
		November	59.692.638.878.566	3.522.317.390.638	4.669.463.669.930
		December	59.477.590.022.087	3.554.220.471.603	4.736.450.095.318

Source: Authors' Data Processing Data Source from Bank Indonesia West Java Province

Referring to the data presented in table 3 above, the conclusion can be drawn that the relaxation policy is not effective because it is unable to change the behavior of borrowers and lenders. This is further reinforced that the NPL data after credit restructuring due to natural disasters shows a figure with a lower limit that occurred in Banjar City in December 2018 with NPL reaching 60.36% (The percentage obtained from NPL in the same month compared to credit restructuring in the previous month). the same) and for the upper limit with NPL reaching 150.47% in Sukabumi City in December 2018. Sukabumi City also became the city with the worst NPL level in 2018 namely the monthly average of 99.82%, worse than Banjar City (88.92%) and Bandung Regency (86.67%). Figures as a percentage of the previous explanation can be seen in a trend in **Figure 1**.

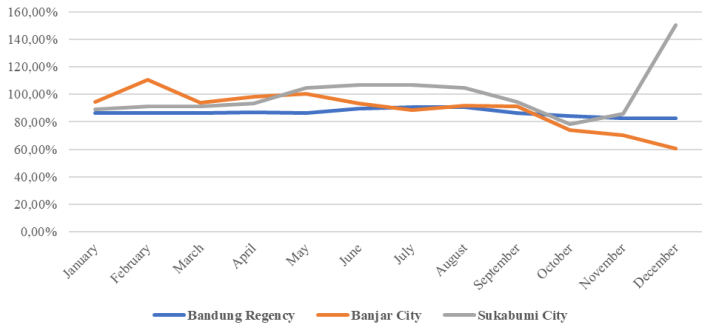

Fig 1. The Comparison of NPL with Credit Restructuring in 2018 in Bandung Regency, Banjar City, and Sukabumi City

The results of the interviews conducted along with the literature review carried out strengthen the preparation of what things need to be determined in the decision tree of the loan approval process, with the display as presented in **Figure 2**.

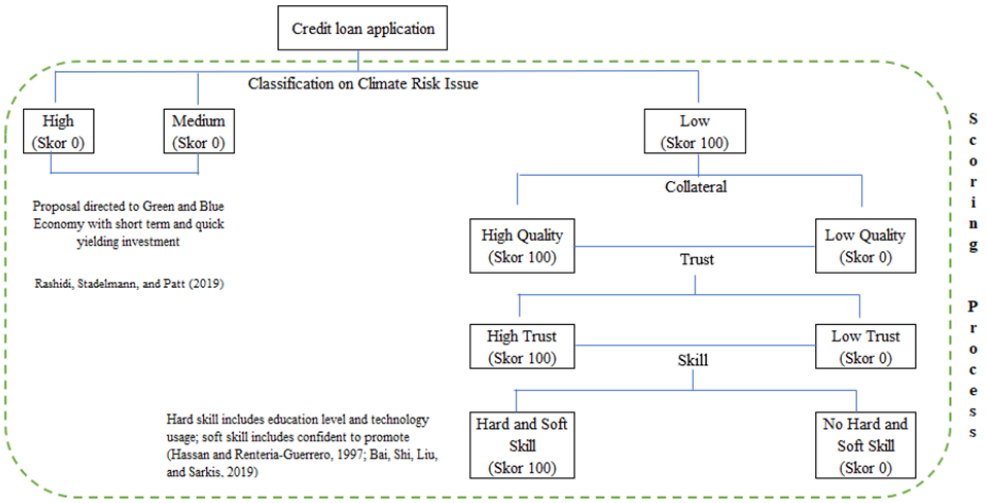

Figure 2. Scoring Process on Credit Loan Application in Rural Society

5 Conclusion

This study applies three stages to provide a complete picture of the presentation of information on the acquisition of secondary and primary data. The effect of the disaster risk index on the amount of credit disbursement growth in the economic sector that is prone to being affected is descriptively described as not having a significant effect, this is indicated by a number of findings in the field where the incidence of NPL agricultural credit is observed to have increased from 9.53% to 9.78%. This also strengthens the study presented by Cardwell (2005) which emphasizes the need for our literacy towards the environment. To avoid excessive neglect, it is important for us to apply ICT as part of the process that must be passed in making credit disbursement decisions. This is important as a mirror for officers in the field to assess credit worthiness as well as provide input or evaluation on the determination of investment grade ratings.

Furthermore, this study also looks at the effectiveness of the credit relaxation policy due to natural disasters through regulations released by the Financial Services Authority. The function of determining the policy socially is also accompanied by the hope that there will be changes in behavior from both the borrower and lender side. The results of secondary data processing and the acquisition of interviews explain the many obstacles in changing behavior from the borrower's side, including the influence of government programs, hereditary business, and special expertise in the business sector. In his study, Koester (2005) considers the need to carry out effective evaluation activities on this matter, for that it is necessary to build an organization among borrowers. This organization can also act as a mediation platform between the parties. The results of this study also imply the importance of the idea of building an organization that can then help borrowers to transform both in terms of skills and thoughts to carry out business activities based on literacy in good natural conditions.

Acknowledgement. Thanks to the National Research and Innovation Agency, Directorate of Economic, Employment and Regional Development Policy for funding the permit investigation.

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