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Original Article

Analysis of Factors Affecting Non-Performing Loan at PT Xyz Financing Company Before and During Covid-19 (2018-2022)

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Abstract

Non-Performing Loan is a situation where the ratio of the volume of non-performing loans (arrears >30 days) to total loans. This study aims to analyse the factors that influence the amount of credit (total loans) and the factors that influence Non-Performing Loan at PT XYZ in the range of 2018-2022. This study aims to analyse the factors that influence the amount of credit (total loans) at PT XYZ measured using multiple linear regression methods, while the factors that influence Non-Performing Loan at PT XYZ are measured using Binary Logistic Regression. The data in this study uses secondary data from PT XYZ in 2018-2022. The results of this study indicate that the factors that affect the amount of credit are Vehicle Price, Effective Rate, Installment Value per month, amount of downpayment (DP), total financing, tenor, age, education, gender, marital status, occupation and unit type, while the factors that affect the chances of customers becoming NPF are inflation, customer area and covid-19 pandemic and the Sumatra area is an area that needs special attention because it has a 121.4% higher chance of becoming an NPL.

Keywords: Amount Finance, Credit Amount, Covid-19, Non Performing Loan.

1. Introduction

The global banking and non-bank financial sectors were under significant pressure even before the world was hit by the covid-19 virus health crisis (Park & Shin, 2021). Among emerging economies, Russia and India, as of October 2019, had gross non-performing loan (NPL) ratios of 10.7% and 10.3% respectively (Serrano, 2021). Advanced economies such as the United States have low NPL rates based on high levels of debt securitisation but high levels of financial stress in the household sector (Prasad & Mathur, 2022).

The Central Bureau of Statistics (BPS) released data in August 2020 that illustrates how Indonesia was affected in the economic aspect by Covid-19 for 6 months (Lusian et al., 2014), Indonesia's economic growth successively fell to 2.97% yoy in April and -5.32% yoy in August 2020 (Sudiarto et al., 2022). The economic contraction occurred as a result of the declining performance of several sectors (transport, manufacturing, trade, and households) that were directly affected by the pandemic (Naveed et al., 2023). This is also a driving factor for the increase in the number of non-performing loans (NPLs) for the banking industry (Apergis et al., 2023). In the first quarter of 2020, the banking NPL ratio based on data from the Financial Services Authority (OJK) stood at 2.77%, an increase compared to the realisation at the end of

2019 (2.30%) (Rothan & Byrareddy, 2020). This value is higher than the financing NPL value which is at 2.82%, is higher than the same period in the previous year, 2.71% (Wu & McGoogan, 2020; Huang et al., 2023). The issuance of OJK regulation Number 11/PJOK.03/2020 concerning National Economic Stimulus as a Countercyclical Policy Impact of the 2019 COVID Spread is crucial for Indonesia's economic growth and financial system stability during this pandemic (Kuswahariani et al., 2020) The regulation states that debtors whose businesses are affected by the pandemic can apply for restructuring to the financing company concerned (Rothan & Byrareddy, 2020). This restructuring is believed to reduce the spike in NPLs because restructured loans will not appear as non-performing loans (defaults) (Gorbalenya et al., 2020). However, until May 2020 OJK noted that the banking NPL ratio continued to rise to 3% (Jalih & Rani, 2020), while the NPL for financing was 4.11% (Iqbal & Saeed, 2023).

In the 2017-2021 period, there was a decrease in the number of companies in Indonesia from a total of 193 companies to only 161 companies (Ari et al., 2021). During this period there were only 5 new licences from the OJK for finance companies, inversely proportional to the number of companies whose licences were revoked as many as 39 companies (Santoso et al., 2019b). The decline in the number of finance companies did not result in the number of existing contracts for financing in Indonesia which continued to increase during the period (Fianto et al., 2019). Where the number of contracts formed increased significantly in 2021 by 156.79% from 27,793 contracts in 2020 to 71,371 contracts in 2021 (Effendhi, 2019).

PT XYZ is one of the finance companies aimed at supporting car sales in Indonesia, this is because car sales in Indonesia are quite high. Therefore, credit becomes one of the alternatives to overcome the difference in income and expenditure for the purchase of cars or other household assets (Barus et al., 2022). The need for car loans in Indonesia is fulfilled by financing products offered by finance companies or multifinance (Ahmad et al., 2018).

In its function as a distributor of car loans, PT XYZ as a finance company that issues financing packages with low Down Payment (DP) and light instalments that require a longer credit period, also experiences the risk of late payments from debtors. According to Nugraheni and Aziza (2020), this delay is called credit risk, which is the loss suffered by the bank (or finance company), because the debtor does not repay the principal and interest on the loan on time (Liu et al., 2023). The increase in low segment sales has caused the quality of receivables in companies (Mappamiring & Lalo, 2023), including at PT XYZ which is categorised as NPF to increase. This increase in NPL is also accompanied by an increase in PT XYZ's net loss.

High NPL conditions, according to Wahyudi (2019), will cause at least three impacts, namely increasing losses thereby reducing profitability, increasing operating costs, and reducing the percentage of Capital Adequacy Ratio (CAR).

In accordance with POJK Number 29/POJK.05/2014, finance companies are required to assess, monitor and take the necessary steps against financing receivables so that the quality of financing receivables is always good (Simatupang et al., 2021). Assessment of the quality of receivables is based on the accuracy of principal and/or interest payments and is categorised into: current (0-30 days late), special mention (>30-90 days late), substandard (>90-120 days late), doubtful (>120-180 days late) and loss (>180 days late). Financing receivables categorised as non-performing financing receivables (NPLs) consist of financing receivables with substandard, doubtful, and loss (delay in payment of more than 90 calendar days) (Benavides-Franco et al., 2023). Thus, the increase in NPLs at PT XYZ is influenced by several factors.

In the research results of Santoso et al. (2019), state that the factors that affect the NPL (Non-Performing Loan) ratio can be caused by internal factors such as policies, human

resources, and others or external factors through changes in macroeconomic factors, such as the loans outstanding variable, BI Rate, and the Rupiah exchange rate against the Dollar. While the factors that have a significant chance of NPLs according to Abid et al. (2014), are age, income, loan ceiling, instalments, tenor, collateral, regional variables and economic sector.

Yurttadur et al. (2019) concluded that, 'one of the short-term effects of the pandemic crisis is the disruption of the functioning of the banking sector and the financing sector which has experienced a surge in non-performing loans and write-offs.' (Figure 1). Based on Figure 1, we can see the increase in Non-Performing Financing from 2018 to the end of 2022.

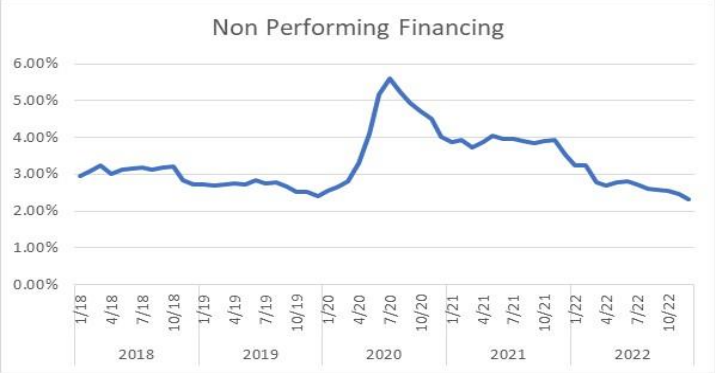

Figure 1. Non-Performing Financing
Source: Financial Services Authority (Processed)

Based on this data, it shows that there is an increase in NPF before and during the COVID-19 pandemic or during 2020-2021. With global economic disruptions such as the COVID-19 pandemic (Zhang et al., 2020), the governments of many countries use Countercyclical Capital Buffer (CCyB) policies that aim to help the financial system reduce risk through credit restrictions by tightening capital requirements (bis.org) (Murthy et al., 2017), where this increase in capital will inhibit the encouragement of banks to take more risks due to expensive capital increases, while the opposite phenomenon occurs (Dwiputri & Sampurno, 2022). Based on this, the researcher wants to further research related to 'Analysis of Factors that affect non-performing loans at PT XYZ finance company during the period before and during covid-19 (2018-2022)'.

Based on the background previously described, the purpose of this research is to analyse the factors that affect the amount of credit (total loans) at PT XYZ, as well as to analyse the factors that affect Non-Performing Loan at PT XYZ.

2. Methods

The method used in this research is descriptive analysis and statistical tests aimed at obtaining an overview of the factors of credit size, factors that cause NPL and the length of late payment of debtors. This research uses secondary data in the form of PT XYZ debtor data taken from PT XYZ. The data taken relates to total loans, late debtor payments and Non-Performing Loans from 2018 to 2022 in the form of monthly data. Other secondary data is obtained from literature and references related to NPL. The total data used in this study is 494,573 customer data recorded at PT XYZ after cleansing from outliers.

In this study, Model 1 aims to analyse the factors that influence the amount of credit or total loans at PT XYZ. The dependent variable in this model is the amount of credit (total loan) measured in million rupiah. The independent variables include vehicle price, debtor's age,

credit interest, number of instalments, down payment, and finance amount. In addition, this model also uses a number of dummy variables such as vehicle type (LCGC, Minibus, Truck/PickUp), employment type (private employee, civil servant, self-employed), education level (D4/S1/S2/S3), marital status, gender, and financing tenor (12, 24, 36, 48, or 60 months).

Meanwhile, Model 2 focuses on analysing the factors that influence Non-Performing Loan (NPL) at PT XYZ. The dependent variable in this model is NPL which is categorised into two, namely NPL (>90 days) with a value of 1, and Non-NPL (≤90 days) with a value of 0. The independent variables in this model include the estimated value of the loan amount ($\hat{Y}1$) which is the result of Model 1, Loan to Value (LTV), inflation rate, debtor location (Java vs other dummy areas), and the influence of the Covid-19 pandemic (dummy variable). These two models are expected to provide an overview of the factors that contribute to the amount of credit and the chances of NPLs. Data processing and analysis techniques in the study were carried out by multiple linear regression analysis and logistic regression.

2.1. Analysis of factors affecting loan size (total loans) at PT XYZ

The first objective of this study was answered by analysing the relationship between the influence of the debtor's background, the debtor's credit scheme and the choice of vehicle type and designation with the amount of credit (total loan) given by the company when taking credit using multiple linear regression. The multiple linear regression equation used is as follows:

$$Y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 D_1 + \beta_8 D_2 + \beta_9 D_3 + \beta_{10} D_4 + \beta_{11} D_5 + \beta_{12} D_6 + \beta_{13} D_7 + \beta_{14} D_8 + \beta_{15} D_9 + \beta_{16} D_{10} + \beta_{17} D_{11} + \beta_{18} D_{12} + \beta_{19} D_{13} + \beta_{20} D_{14} + \beta_{21} D_{15} + ei$$

Description:
Y_1 = amount of credit or total loan (million rupiah)
X_1 = vehicle price (million rupiah)
X_2 = age of debtor (years)
X_3 = credit interest, credit interest charged to debtors (% per annum)
X_4 = total instalments, the amount of expenses that must be paid by the debtor each month, consisting of principal and loan interest (million rupiah)
X_5 = down payment (million rupiah)
X_6 = amount of financing, the principal loan given to the debtor (million rupiah)
D_1 = dummy variable LCGC/low cost green car vehicle type
D_1 = 1 if vehicle type is LCGC
D_1 = another owise
D_2 = dummy variable minibus vehicle type
D_2 = 1 if minibus vehicle type
D_2 = another 0
D_3 = dummy variable truck and pickup vehicle type
D_3 = 1 if the vehicle type is truck and pickup
D_3 = another 0
D_4 = dummy variable employment type private employee
D_4 = 1 if private employee job type
D_4 = another 0
D_5 = dummy variable employment type civil servant
D_5 = 1 if job type civil servant
D_5 = another 0
D_6 = dummy variable self-employed job type
D_6 = 1 if job type is self-employed
D_6 = another 0
D_7 = dummy variable education

D_7 = 1 if undergraduate education
D_7 = another 0
D_8 = dummy variable education
D_8 = 1 if the education is d4 / s1 / s2 / s3
D_8 = another 0
D_9 = dummy variable marital status
D_9 = 1 if married
D_9 = another 0
D_{10} = dummy variable gender
D_{10} = 1 if male
D_{10} = another 0
D_{11} = dummy variable tenor of financing 12 / one year
D_{11} = 1 if the debtor takes a two-year financing tenor
D_{11} = another 0
D_{12} = dummy variable 24/two years financing tenor
D_{12} = 1 if the debtor takes a two-year financing tenor
D_{12} = another 0
D_{13} = dummy variable tenor financing 36 / three years
D_{13} = 1 if the debtor takes a three-year financing tenor
D_{13} = another 0
D_{14} = dummy variable tenor financing 48 / four years
D_{14} = 1 if the debtor takes a four-year financing tenor
D_{14} = another 0
D_{15} = dummy variable tenor financing 60 / five years
D_{15} = 1 if the debtor takes a five-year financing tenor
D_{15} = another 0
B_0 = multiple linear regression intercepts
β_j = Regression coefficient of independent variable-j, where j = (Vehicle price, Age, Credit interest, Number of instalments, Income/Income, Down payment, Amount of finance, Type of first instalment (ADDM/ADDB), Purpose of vehicle use, Type of vehicle LCGC/Low Cost Green Car, Minibus vehicle type, Truck and PickUp vehicle type, Employee job type, Self-employed job type, Education, Dependents, Marital status, Gender, Financing package, 24/two years financing tenor, 36/three years financing tenor, 48/four years financing tenor, and 60/five years financing tenor)
i = number of samples

The model is expected to be able to determine the factors that affect the amount of credit and can be used to make predictions/estimates of the value of the amount of credit. Furthermore, this result will be used as one of the independent factors in the stage of fulfilling the second and third objectives in the research and become the predicted credit amount factor ($\hat{Y}1$).

2.2. Analysis of factors affecting Non-Performing Loan at PT XYZ

The second objective of this research is answered by analysing the factors that influence Non Performing Loan using Binary Logistic Regression. This is done because the category of the dependent variable (NPL) is binary. In this second analysis, the loan size (total loans) which in the previous analysis was the dependent variable, in this equation the result of the analysis in the form of the estimated loan size ($\hat{Y}1$) is used as the independent variable. Other independent variables used are Loan to Value (LTV), inflation taken from the Bank Indonesia website from 2018-2022, debtor area and debtor business segment. The Binary Logistic Regression equation used is as follows:

$$y = c + a_1x_1 + a_2x_2 + \cdots + a_nx_n$$

The logistic regression equation used from the estimated form of the probability function p is expressed in the equation below:

$$p = \frac{exp(y)}{1 + exp(y)}$$

Then, the above equation is logit transformed, to simplify it in logit form as follows:

$$p = \frac{\exp(y)}{1+\exp(y)} = \frac{1}{1+\exp(-y)}$$

$$p + p\exp(-y) = 1$$

$$\mathrm{p}\exp(-y) = 1 - p$$

$$\exp(y) = \frac{p}{1-p}$$

$$\mathrm{y} = \mathrm{In}\left(\frac{p}{1-p}\right)$$

$$\mathrm{y} = \mathrm{In}\left(\frac{p}{1-p}\right) = \mathrm{c} + \mathrm{a_1x_1} + \mathrm{a_2x_2} + \cdots + \mathrm{a_nx_n}$$

So, the equation for Non Performing Loan by including the alleged amount of credit as one of the independent variables is as follows:

$$\text{Logit NPL } (Y_2) = \delta_0 + \delta_1\hat{Y}_1 + \delta_2X_7 + +\delta_3D_{16}+\delta_4D_{17}$$

$$\text{Logit NPL (Y2)} = \frac{1}{1+e-\left(\delta 0 + \delta 1\hat{Y}1 + \delta 2X7 + \delta 3D16 + \delta 4D17\right)}$$

Description:
NPL (Y_2) = Non-Performing Loan (NPL) with delay categories: NPL (>90 days) = 1, non NPL (≤ 90 days) = 0
$\hat{Y}_1$ = Estimated value of credit amount (Fits) in the previous analysis (million rupiah)
X_7 = Inflation rate, this variable shows the inflation rate that applies when financing is channeled to debtors (%)
D_{16} = Dummy variable of debtor location in Java area
D_{16}= 1 if the debtor's location is in Java area
D_{16} = another 0
D_{17} = Dummy variable Covid-19 Pandemic
D_{17} = 1 if affected by the Covid-19 pandemic
D_{17} = another 0
δ_0 = Logistic regression intercept
δ i = Regression coefficient of independent variable-i, where i = (loan size, Loan to value (LTV), debtor area, business segment, and inflation rate)

The model produced by the equation is expected to be used to determine the factors that affect NPL. The equation model is also expected to be used to make predictions of Non Performing Loan debtors at PT XYZ.

3. Results and Discussion

3.1. Linear Regression Analysis Factors affecting loan size

3.1.1. Linear Regression with Complete Dataset

The variables or factors that influence the amount of credit are determined based on previous research and also the results of discussions with the supervisor, but there are limitations in the form of data obtained from the company, where the form of data is categorical which results in processing using linear regression resulting in relatively small adjusted R-Square results.

Table 1. Linear regression analysis (full dataset)

Variable	Coefficient	Std Error	P-Value	Significant *
Intersep	39741834	138679	0.000	**Yes**
GroupOTR_1. ≤ 150	-11631774	111599	0.000	**Yes**
GroupOTR_2. >150 - ≤ 300	-9053990	106881	0.000	**Yes**
GroupOTR_3. >300 - ≤ 450	-7288609	104613	0.000	**Yes**
GroupOTR_4. >450 - ≤ 600	-5684546	99765	0.000	**Yes**
GroupEffRate_1. ≤ 2.5%	2414795	79085	0.000	**Yes**
GroupEffRate_2. >2.5% - ≤ 5%	-978706	101051	0.000	**Yes**

Variable	Coefficient	Std Error	P-Value	Significant *
GroupEffRate_3. >5% - ≤ 7.5%	1660893	38034	0.000	**Yes**
GroupEffRate_4. >7.5% - ≤ 10%	740878	21573	0.000	**Yes**
GroupInst_1. ≤ 2.5	-9938160	62447	0.000	**Yes**
GroupInst_2. >2.5 - ≤ 5	-3626487	51226	0.000	**Yes**
GroupInst_3. >5 - ≤ 7.5	-1580750	44528	0.000	**Yes**
GroupInst_4. >7.5 - ≤ 10	-1753544	40463	0.000	**Yes**
GroupDP_1. ≤ 10%	-967026	52919	0.000	**Yes**
GroupDP_2. >10 - ≤ 20	3798618	32609	0.000	**Yes**
GroupDP_3. >20 - ≤ 30	4284248	26531	0.000	**Yes**
GroupDP_4. >30 - ≤ 40	1885376	26203	0.000	**Yes**
GroupAF_1. ≤ 150	-15,773,106	170410	0.000	**Yes**
GroupAF_2. >150 - ≤ 300	-12,213,117	167445	0.000	**Yes**
GroupAF_3. >300 - ≤ 450	-8,026,493	163785	0.000	**Yes**
GroupAF_4. >450 - ≤ 600	-752,580	163638	0.000	**Yes**
GroupTenor_12	-17,479,026	61977	0.000	**Yes**
GroupTenor_24	-13,319,060	37630	0.000	**Yes**
GroupTenor_36	-9,063,866	25494	0.000	**Yes**
GroupTenor_48	-5411743	22225	0.000	**Yes**
GroupAge_1. ≤ 20	-4324176	93747	0.000	**Yes**
GroupAge_2. >20 - ≤ 30	-143957	26775	0.000	**Yes**
GroupAge_3. >30 - ≤ 40	670613	22676	0.000	**Yes**
GroupAge_4. >40 - ≤ 50	650471	22433	0.000	**Yes**
GroupEdu_D1/D2/D3	-4137458	27479	0.000	**Yes**
GroupEdu_D4/S1/S2/S3	-66564	17668	0.000	**Yes**
MaritalStat_MAR	4517061	27262	0.000	**Yes**
MaritalStat_SIN	1104389	34014	0.000	**Yes**
Gender_M	1152605	16910	0.000	**Yes**
GroupProfession_EMPLOYEE	3797342	25487	0.000	**Yes**
GroupProfession_ENTREPRENEURS	3298658	25934	0.000	**Yes**
GroupModel_LCGC	1477794	27325	0.000	**Yes**
GroupModel_OTHERS	-6868081	116028	0.000	**Yes**
GroupModel_SUV	1440369	22849	0.000	**Yes**
GroupModel_TRUCK & PICKUP	-1338231	42772	0.000	**Yes**

Based on Table 1, the variables contained in the research model affect the amount of credit, which means that it will also affect non-performing loans. In the table, it can be seen that all vehicle price groups have a real effect on the amount of credit with a p-value of 0.000. Vehicle prices affect the amount of credit in accordance with Wahyudi's research (2019) which states that vehicle prices affect the amount of customer credit.

The coefficient value of the vehicle price group ≤ 150 is -11,631,774, which means that if the customer enters the vehicle price group ≤ 150, the estimated credit amount will decrease by IDR 11,631,774 compared to other variable categories with the assumption that the value of the other variables is constant. As for other vehicle price groups that are also influential, they have different coefficient values.

For the vehicle price group >150 - ≤ 300, the coefficient value is -9,053,990, which means that if the customer enters the vehicle price group, the expected amount of credit will decrease by Rp9,053,990 compared to the other variable categories assuming the other variable values remain constant. Likewise, the vehicle price group >300 - ≤ 450 has a coefficient value of -7,288,609, which means that the amount of credit is expected to decrease by Rp7,288,609 compared to other variable categories assuming other variables remain constant. For the vehicle price group >450 - ≤ 600, the coefficient value is -5,684,546, which indicates that the amount of credit is expected to decrease by Rp5,684,546 compared to other variable categories assuming other variable values remain constant.

Group effective rate or credit interest affects the amount of credit with a p-value of 0.000 for all categories. In line with research conducted by Murthy et al (2017) which states that

credit interest affects the amount of credit. The first category is the effective rate ≤ 2.5% with a coefficient value of 2,414,795, which means that if the customer falls into the effective rate ≤ 2.5% category, it will increase the expected amount of credit by IDR 2,414,795 compared to other variable categories with the assumption that the value of other variables is constant.

- Effective Rate > 2.5% - ≤ 5% with a coefficient value of -978,706 which means that if the customer enters the effective rate category > 2.5% - ≤ 5%, it will reduce the alleged amount of credit by Rp978,706 compared to other variable categories with the assumption that the value of other variables remains.
- Effective Rate >5% - ≤ 7.5% with a coefficient value of 1,660,893 which means that if the customer enters the category of effective rate >5% - ≤ 7.5%, it will increase the alleged amount of credit by Rp1,660,893 compared to other variable categories with the assumption that the value of other variables remains.
- Effective Rate >7.5% - ≤ 10% with a coefficient value of 740,878 which means that if the customer enters the category of effective rate >7.5% - ≤ 10%, it will increase the alleged amount of credit by Rp740,878 compared to other variable categories with the assumption that the value of other variables remains constant.

Group installments or the amount of credit payments per month affect the amount of credit with a p-value of 0.000. Wahyudi's research (2019) states that the amount of credit payments per month affects the amount of credit. In the first group ≤ 2.5 has a coefficient value of -9,938,160 which means that if the customer enters the installment group ≤ 2.5, it will reduce the estimated credit amount of Rp9,938,160 compared to other variable categories with the assumption that the value of the other variables remains.

- Group installment > 2.5 - ≤ 5 has a coefficient value of -3,626,487 which means that if the customer enters the group installment > 2.5 - ≤ 5 will reduce the alleged amount of credit of Rp3,626,487 compared to other variable categories with the assumption that the value of other variables is fixed.
- Group installment >5 - ≤ 7.5 has a coefficient value of -1,580,750 which means that if the customer enters the group installment >5 - ≤ 7.5 will reduce the alleged credit amount of Rp1,580,750 compared to other variable categories assuming the value of other variables remains constant.
- Group installment > 7.5 - ≤ 10 has a coefficient value of -1,753,544 which means that if the customer enters the group installment > 7.5 - ≤ 10 will reduce the alleged credit amount of Rp1,753,544 compared to other variable categories assuming the value of the other variables remains constant.

The group down payment (DP) deposited by customers in this financing also affects the amount of credit with a p-value of 0.000. This is also the same as previous research conducted by Mubaroq et al. (2022) which states that DP affects NPL. In the DP ≤ 10% group, it has a coefficient value of -967.026, which means that if the customer enters the DP ≤ 10% group, it will reduce the estimated credit amount by Rp967.027 compared to other variable categories, assuming the value of the other variables is constant.

- Group DP>10% - ≤ 20% has a coefficient value of 3,798,618 which means that if the customer enters the DP>10% - ≤ 20% group, it will increase the alleged credit amount of Rp3,798,618 compared to other variable categories assuming the value of the other variables is constant.
- The DP >20% - ≤ 30% group has a coefficient value of 4,284,248 which means that if the customer enters the DP >20% - ≤ 30% group, it will increase the alleged credit amount of Rp. 4,284,248 compared to other variable categories assuming the value of the other variables remains constant.
- The DP >30% - ≤ 40% group has a coefficient value of 1,885,375 which means that if the customer enters the DP >30% - ≤ 40% group, it will increase the alleged credit amount of Rp1,885,375 compared to other variable categories assuming the value of the other variables remains constant.

Amount Finance (AF) or the amount of financing obtained by customers as a whole affects the amount of credit with a p-value of 0.000. Ghulam et al. (2018) state that customers who have low income and get loans with high loan to value and buy expensive cars in a relatively short period of time are more likely to default. In the AF ≤ 150 group, the coefficient value is -15,773,106, which means that if the customer enters the AF ≤ 150 group, it will reduce the estimated credit amount by IDR 15,773,106 compared to other variable categories, assuming the value of the other variables is constant.

- Group AF ≤ 150 has a coefficient value of -15,773,106 which means that if the customer enters the AF group ≤ 150, it will reduce the alleged credit amount of Rp. 15,773,106 compared to other variable categories assuming the value of the other variables is constant.
- Group AF > 150 - ≤ 300 has a coefficient value of -12,213,117 which means that if the customer enters the AF group > 150 - ≤ 300, it will reduce the alleged credit amount of Rp12,213,117 compared to other variable categories assuming the value of the other variables remains constant.
- Group AF > = 300 - ≤ 450 has a coefficient value of -8,026,493 which means that if the customer enters the AF group > = 300 - ≤ 450, it will reduce the alleged credit amount of IDR 8,026,493 compared to other variable categories with the assumption that the value of the other variables remains.
- Group AF > = 450 - ≤ 600 has a coefficient value of -752.580 which means that if the customer enters the AF group > = 450 - ≤ 600, it will reduce the alleged credit amount of Rp. 752.580 compared to other variable categories with the assumption that the other variable values are constant.

Group Tenor or the length of the credit period affects NPLs for all categories with a p-value of 0.000. These results are in line with previous research by Mubaroq et al (2022) which states that tenor affects NPLs, while according to Kumar et al. (2017) states that tenor or payment period affects a person's payment behaviour. The 12-month tenor group has a coefficient value of -17,479,026, which means that customers who have a 12-month tenor will reduce the estimated amount of credit by Rp17,479,026 compared to other variable categories assuming other variables remain.

- The 24-month tenor group has a coefficient value of -13,319,060 which means that customers who have a tenor of 24 months will reduce the alleged amount of credit by Rp13,319,060 compared to other variable categories with the assumption that the other variables remain.
- The 36-month tenor group has a coefficient value of -9,063,866 which means that customers who have a 36-month tenor will reduce the alleged amount of credit by Rp9,063,866 compared to other variable categories assuming other variables remain constant.
- The 48-month tenor group has a coefficient value of -5,411,743 which means that customers who have a 48-month tenor will reduce the alleged amount of credit by Rp5,411,743 compared to other variable categories assuming other variables remain constant.

The age of the debtor in this linear regression equation has a real effect on NPL with a p-value of 0.000. The results obtained contradict previous research conducted by Ridfa et al (2018) which state that the age of the debtor has no effect on the NPL value. Age group ≤ 20 with a coefficient value of -4,324,176 which means that each customer who is included in the age group ≤ 20 will reduce the estimated amount of credit by IDR 4,324,176 compared to other variable categories assuming other variables remain constant.

- Age group >20 - ≤ 30 with a coefficient value of -143.957 which means that each customer who is included in the age group >20 - ≤ 30 will reduce the estimated amount of credit by Rp143.957 compared to other variable categories assuming other variables remain constant.
- Age group >30 - ≤ 40 with a coefficient value of 670.613 which means that each customer belonging to the age group >30 - ≤ 40 will increase the estimated amount of credit by

Rp670.613 compared to other variable categories assuming other variables remain constant.

- Age group > 40 - ≤ 50 with a coefficient value of 650.471 which means that each customer belonging to the age group > 40 - ≤ 50 will increase the estimated amount of credit by Rp 650.471 compared to other variable categories assuming other variables remain constant.

The results obtained for the debtor's education level variable in this linear regression equation have a significant effect on NPL with a p-value of 0.000. This is in line with previous research conducted by Ridfa et al (2018), Mubaroq et al (2022) which states that the age of the debtor affects the NPL value. The customer's education level falls into the D1/D2/D3 category, with a coefficient value of -4,137,458. This indicates that customers with a Diploma 1, Diploma 2, or Diploma 3 education level are associated with a reduction of IDR 4,137,458 in the estimated credit amount compared to customers in other education categories, assuming all other variables remain constant.

- The level of education of customers included in the Diploma (D4) / Bachelor (S1) / Master (S2) / Doctor (S3) group with the results of the coefficient value of -66.564 which means that each customer included in the Diploma (D4) / Bachelor (S1) / Master (S2) / Doctor (S3)group will reduce the estimated amount of credit by Rp66.564 compared to other variable categories assuming other variables remain constant..

The variable effect of male gender on the amount of credit is obtained with a p-value of 0.000 and a coefficient value of 1,152,605, which means that each customer belonging to the male group will increase the estimated amount of credit by Rp1,152,605 compared to other variable categories assuming other variables remain constant. Like previous research conducted by Sekyi (2017) which states that gender is a significant variable on the amount of credit. Research conducted by Li (2021) in India that women get a lower score even with the same criteria as men for used car financing. This shows that men still have more value than women in the field of financing, where women must have a much greater value to get the same final result as men.

The marital status of the customer also affects the loan amount with a p-value of 0.000. Married customers have a coefficient value of 4,517,061 which means that each married customer will increase the expected amount of credit by Rp4,517,061 compared to other variables assuming other variables remain constant.

The same thing is also obtained for customers who are single or unmarried with a coefficient value of 1,104,389, which means that the alleged credit amount will increase by Rp1,104,389 compared to other variables. In line with research conducted by Ghulam et al (2018), it states that customers with unmarried status have a 60% greater probability of default than others.

The profession of customers who are included in the employee group has an effect on the amount of credit with a p-value of 0.000 and a coefficient value of 3,797,342, meaning that each customer who is an employee will increase the alleged amount of credit by Rp3,797,342 compared to other variable categories assuming other variables remain constant. Meanwhile, the profession of customers who are included in the self-employed group affects the amount of credit with a coefficient of 3,298,658, meaning that each customer who is an employee will increase the alleged amount of credit by Rp3,298,658 compared to other variable categories assuming other variables remain constant. Like previous research conducted by Sekyi (2017) which states that gender is a significant variable on the amount of credit, in another study, Ghulam et al (2018) stated that customers with self-employed status have large loan arrears.

Vehicle model affects the amount of credit. The LCGC model group has a coefficient value of 1,477,794, which means that each customer who chooses the LCGC vehicle model will

increase the expected amount of credit by Rp1,477,794 compared to other variable categories with the assumption that the other variables remain constant.

- The SUV model group has a coefficient value of 1,440,368 which means that each customer who chooses an SUV vehicle model will increase the estimated amount of credit by Rp1,440,368 compared to other variable categories assuming other variables remain constant.
- The TRUCK & PICKUP model group has a coefficient value of -1,338,231 which means that each customer who chooses the TRUCK & PICKUP vehicle model will reduce the estimated amount of credit by Rp1,338,231 compared to other variable categories assuming other variables remain constant.
- Group models other than LCGC, SUV and TRUCK & PICKUP have a coefficient value of -6,868,081 which means that each customer who chooses a vehicle model other than those mentioned will reduce the estimated amount of credit by Rp6,868,081 compared to other variable categories assuming other variables remain constant.

Based on the description in the table, the sign (+/-) is a notation that indicates the effect of the research variables on the total amount of credit at PT XYZ. This is supported by the results of the adjusted R Square value which has a value of 0.269, which means that the model formed can only explain 26.9% of the diversity of the amount of credit. The assumption used in this model is the turkey method or the removal of outliers to improve the robustness and interpretability of the model. This model can be used as an approach to deal with outliers. Tukey's method utilises the concept of IQR (Interquartile Range) to identify extreme values that could potentially affect the regression estimates. By removing or dealing with outliers, this method has the potential to improve the accuracy and generalisability of the model. Tukey's concept of outlier removal involves the calculation of the Interquartile Range (IQR), which is obtained by subtracting the first quartile value (Q1) from the third quartile value (Q3). The IQR formula is:

$$IQR = Q3 - Q1$$

After obtaining the IQR values, the upper bound and lower bound for detecting outliers can be calculated:

Upper bound: $Q3 + (1.5 \times IQR)$

Lower bound: $Q1 - (1.5 \times IQR)$

A. Complete Dataset Classical Assumption Test

a. Multicollinearity Test

Multicollinearity test is used to test whether the variables studied have a relationship between independent variables. Steps to detect the relationship between the variables of this study by looking at the exploratory test with the Correlation Matrix Plot:

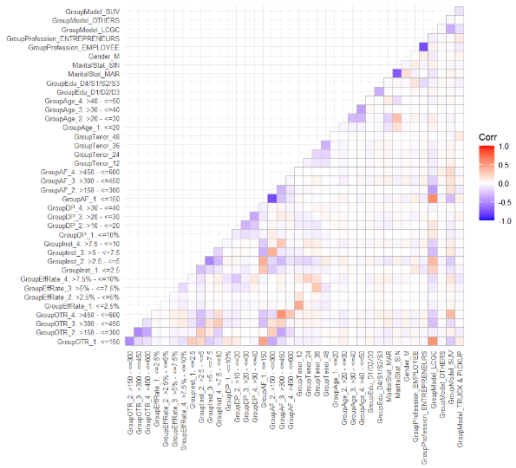

Figure 1. Correlation Matrix Plot Test Results

Symptoms of multicollinearity can be seen in dark-coloured boxes, while light-coloured or near-white boxes indicate a low correlation between a pair of variables. Dark purplish-coloured boxes indicate a strong negative correlation, while dark reddish-coloured boxes indicate a strong positive correlation. In this case, at first glance, negative muticollinearity symptoms occur between Group AF 1 (≤ 150) and Group AF 2 (150-300), while positive multicollinearity symptoms occur between Group AF 1 (≤ 150) and Group LCGC Model.

b. Normality Test

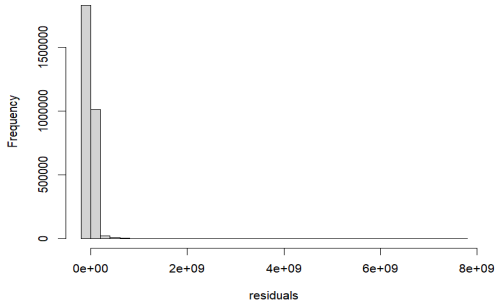

Figure 2. Histogram of residuals

The normality test explains a condition where the remaining prediction results obtained follow a normal distribution. The following are the results of checking through exploratory tests with histograms:

Exploratively, it appears that the distribution of residuals is skewed to the right, as evidenced by the concentration of residual values around the value of 0, while there is a small portion of residuals spread at the upper values, even approaching 8,000,000,000. These extreme residual values clearly indicate that the normality assumption is not met.

The Kolmorov-Smirnov test results give the following results:

```
        One-sample Kolmogorov-Smirnov test

data:  residuals
D = 0.63358, p-value < 2.2e-16
alternative hypothesis: two-sided
```

The p-value is far below alpha = 5%, which means that the residual distribution is not normal (the normality assumption is not met).

c. Homoscedasticity Test

Describes the condition when the standardised residuals have constant variance across predicted values. The following results are checked through an exploratory test with a scatter plot between the standardised residual values and the predicted Y (OSAR) values:

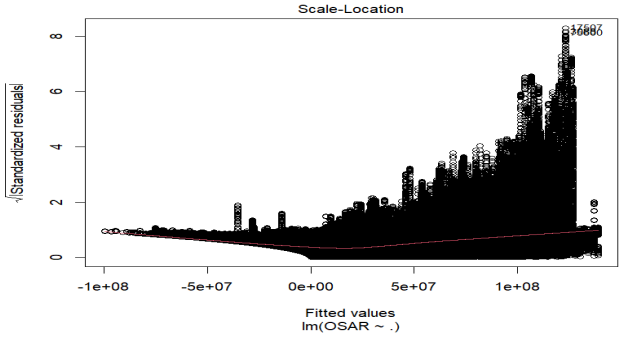

Figure 3. Homoscedasitisity Test Results

Exploratively, it can be seen that the distribution of points on the scatter plot does not form a constant distribution on the estimated value of OSAR (X-axis), so it is likely that the assumption of homoscedasticity is not met.

B. Linear Regression with AF ⩽ 300 Million and >300 Million

The results of linear regression analysis for the first AF (≤ 300 million) with the same function, the adjusted R-square is 20.9%, while for the second AF (> 300 million) the adjusted R-square value is 17.7%. The vehicle price variable ≤ 150 has a coefficient value of -6,760,267 for the first AF, which means that if the customer enters the vehicle price group ≤ 150, the expected amount of credit will decrease by Rp6,760,267 compared to other variable categories with the assumption that the value of other variables is fixed. Meanwhile, the second AF does not have this variable.

The following results are obtained for the vehicle price variable with several groupings: vehicle price > 150 - ≤ 300, the coefficient value is -4,241,644 for the first AF group, which means that if the customer enters the vehicle price group > 150 - ≤ 300, the estimated amount of credit will decrease by Rp4,241,644 compared to other variable categories assuming the value of the other variables is constant. As for the second AF, the same variable obtained a coefficient value of -14,432,642, then the estimated amount of credit will decrease by Rp14,432,642 compared to other variable categories assuming the value of other variables remains constant.

- The first AF, vehicle price > 300 - ≤ 450, the coefficient value is -1,892,577 which means that if the customer enters the vehicle price group > 300 - ≤ 450, the expected credit amount will decrease by 1,892,577 compared to other variable categories with the assumption that the other variable values are constant. Despite having the same p-value for this variable, the second AF has a different coefficient value. In the vehicle price variable that is in the range > 300 - ≤ 450 has a coefficient value of -11,798,125.
- Vehicle prices >450 - ≤ 600 for the first AF, the coefficient value is - 2,689,524, which means that if the customer enters the vehicle price group >450 - ≤ 600, the estimated credit amount will decrease by IDR 2,689,524 compared to other variable categories assuming the value of the other variables is constant. Meanwhile, this variable in the second AF group has a coefficient value of -5,701,292.

The next variable is the effective rate, where the effective rate for the first AF grouping with a variable ≤ 2.5% with a coefficient value of 2,549,529, which means that if the customer falls into the effective rate ≤ 2.5% category, it will increase the expected amount of credit by IDR 2,549,529 compared to other variable categories, assuming the value of other variables is constant. Different results are obtained for the second AF grouping, this variable has a p-value of 5.2%, which means that it has no effect.

- Effective Rate > 2.5% - ≤ 5% for the first AF, obtained a coefficient value of -1,242,675 which means that if the customer falls into the effective rate category > 2.5% - ≤ 5%, it will reduce the expected amount of credit by Rp1,242,675 compared to other variable categories with the assumption that the value of the other variables is fixed. Meanwhile, the second AF has a coefficient value of 1,148,076.
- Effective Rate >5% - ≤ 7.5% with a coefficient value of 1,296,559 which means that if the customer falls into the effective rate category >5% - ≤ 7.5%, it will increase the estimated amount of credit by Rp1,296,559 compared to other variable categories with the assumption that the value of the other variables remains. While the second AF has a coefficient value of 3,337,918.
- Effective Rate >7.5% - ≤ 10% with a coefficient value of 622,998 which means that if the customer falls into the effective rate category >7.5% - ≤ 10%, it will increase the estimated amount of credit by Rp622,998 compared to other variable categories with the assumption that the value of the other variables remains. While the second AF coefficient value is 1,055,218.

The installment group ≤ 2.5 for the first AF has a coefficient value of -9,501,254 which means that if the customer enters the installment group ≤ 2.5, it will reduce the estimated credit amount of Rp9,501,254 compared to other variable categories with the assumption that the value of other variables is fixed. For AF value > 300 million there are no customers with installment ≤ 2.5.

- Group installment >2.5 - ≤ 5 has a coefficient value of -3,101,482 which means that if the customer enters the group installment >2.5 - ≤ 5 will reduce the alleged amount of credit Rp3,101,482 compared to other variable categories with the assumption that the value of other variables remains. Meanwhile, the same variable in the second AF group has a relatively smaller coefficient value of 1,009,721.
- Group installment >5 - ≤ 7.5 has a coefficient value of -1,070,555 which means that if the customer enters the installment group >5 - ≤ 7.5, it will reduce the expected amount of credit by Rp1,070,555 compared to other variable categories with the assumption that the value of other variables remains fixed. The second AF has a smaller coefficient - 1,629,993.
- Group installment >7.5 - ≤ 10 has a coefficient value of -1,230,421 which means that if the customer enters the group installment >7.5 - ≤ 10 will reduce the alleged credit amount of Rp1,230,421 compared to other variable categories with the assumption that the value of other variables is fixed. The coefficient value on the second AF is - 1,547,827.

In the first AF grouping for the DP ≤ 10% group has a coefficient value of -946,120 which means that if the customer enters the DP ≤ 10% group, it will reduce the estimated credit amount of Rp946,120 compared to other variable categories with the assumption that the other variable values are constant. Meanwhile, the second AF has a coefficient value of -1,632,370 which means that if the customer is included in the DP group, it will reduce the estimated credit amount by IDR 1,632,370 with the same assumptions.

- The DP >10% - ≤ 20% group in the first AF has a coefficient value of 3,892,873, which means that if the customer enters the DP >10% - ≤ 20% group, it will increase the expected credit amount by Rp3,892,873 compared to other variable categories, assuming the value of the other variables remains the same. Meanwhile, the second AF has a coefficient value of 3,025,124.
- The DP > 20% - ≤ 30% group has a coefficient value of 4,279,617, which means that if the customer enters the DP > 20% - ≤ 30% group, it will increase the estimated credit amount of IDR 4,279,617 compared to other variable categories with the assumption that the value of the other variables is constant. Meanwhile, for the second AF, the coefficient value is 4,004,629.
- The DP >30% - ≤ 40% group has a coefficient value of 1,711,819, which means that if the customer enters the DP >30% - ≤ 40% group, it will increase the expected credit amount by Rp1,711,819 compared to other variable categories with the assumption that the value of other variables remains the same. Meanwhile, for the second AF, the coefficient value is 2,079,261.

The coefficient value of the linear regression analysis results for the DP group variable can be concluded that the coefficient for the second AF group (> 300) million always has a smaller coefficient value than the first AF and also in the second AF there are variables that do not affect the amount of credit, namely the group effective rate > 2.5% - ≤ 5%.

The Amount Finance (AF) variable within the first AF has two variables, namely >150 million - ≤ 300 million, >300 million - ≤ 450 million and >450 million-≤ 600 million. However, for the >150 - ≤ 300 million group, regression cannot be done because it is NA or Not Available. As for the >300 million group, there is one variable that has similar results (NA), the variable is ≤ 150 million. This can occur due to several factors. One of them is perfect collinearity, where one or more variables in the model have a perfect linear relationship with each other, making it impossible to separate the effects of each variable separately. In addition, 'NA' can also arise if there are variables that have no variation in the data sample used for analysis, or if the number of observations is too small to produce accurate estimates. In this

case, the solution is to remove the variables whose coefficients are 'NA' from the regression model.

The first AF for the variable AF ≤ 150 has a coefficient value of -3,481,596 which means that if the customer enters the AF ≤ 150 group, it will reduce the estimated credit amount by Rp3,481,596 compared to other variable categories assuming the value of the other variables is constant. The second AF does not have a variable ≤ 150 million, but > 300 - ≤ 450 million has a coefficient value of - 4,485,890 which means that customers who enter this group will reduce the alleged amount of credit by IDR 4,485,890 compared to other variable categories assuming other variables remain. And for the coefficient value of the variable AF> 450 ≤ 600 million is 3,480,856.

The 12-month tenor variable for the first AF has a coefficient value of -17,163,615, which means that customers who have a 12-month tenor will reduce the expected amount of credit by Rp17,163,615 compared to other variable categories with the assumption that the other variables are constant. Meanwhile, the coefficient value of the same variable for the second AF is -17,456,319.

- The 24-month tenor group has a coefficient value of -13,363,972, which means that customers who have a 24-month tenor will reduce the estimated amount of credit by Rp13,363,972 compared to other variable categories with the assumption that other variables remain. While the value of the second AF is obtained smaller with the number -12,670,535.
- The 36-month tenor group has a coefficient value of -9,111,845, which means that customers who have a 36-month tenor will reduce the expected amount of credit by Rp9,111,845 compared to other variable categories with the assumption that other variables remain. For the same variable, the second AF has a coefficient value of 9,156,086.
- The 48-month tenor group has a coefficient value of -5,500,744, which means that customers who have a tenor of 48 months will reduce the expected amount of credit by Rp5,500,744 compared to other variable categories with the assumption that other variables remain. Meanwhile, the second AF coefficient value is obtained - 4,935,465.

The age of the debtor in the first grouping (≤ 300 million) for the age variable ≤ 20 with the results of the coefficient value of -4,493,318 which means that each customer who is included in the age group ≤ 20 will reduce the estimated amount of credit by Rp4,493,318 compared to other variable categories with the assumption that the other variables remain. Meanwhile, for the same variable in the second AF group, a significantly different coefficient value is obtained, 2,705,125, which will increase the estimated credit amount by IDR 2,705,125 with the same assumptions.

- Age group >20 - ≤ 30 with a coefficient value of -178.503 which means that each customer who is included in the age group >20 - ≤ 30 will reduce the expected amount of credit by Rp178.503 compared to other variable categories with the assumption that the other variables remain. As for AF, these two variables have no effect on the amount of credit because the p-value is 28%.
- Age group >30 - ≤ 40 with the result of a coefficient value of 740.784 which means that each customer belonging to the age group >30 - ≤ 40 will increase the estimated amount of credit by Rp740.784 compared to other variable categories assuming other variables remain constant. The coefficient value obtained is smaller for the second AF, 190.518, which means that customers included in this variable will increase their estimated credit by Rp190.518.
- Age group >40 - ≤ 50 with the result of a coefficient value of 658.309 which means that each customer who is included in the age group >40 - ≤ 50 will increase the estimated credit amount by IDR 658.309 compared to other variable categories assuming other variables remain constant. The second AF has a coefficient value of 665.837.

The results obtained for the debtor's education level variable in the first AF group are variable D1 / D2 / D3 with a coefficient value of -4,209,529, which means that each customer

belonging to the D1 / D2 / D3 group will reduce the expected amount of credit by IDR 4,209,529 compared to other variable categories with the assumption that other variables remain. While the coefficient value for the second AF is -3,489,200.

- The level of education of customers included in the D4 / S1 / S2 / S3 group has a p-value of 0.88, which means that in this AF group, the variable level of education D4 / S1 / S2 / S3 has no real effect. Meanwhile, in the second AF group, the coefficient value is -560.386, which means that each customer who enters the D4 / S1 / S2 / S3 education level will reduce the estimated credit amount by Rp560.386.

The marital status of customers in the first AF group, for the married customer variable, has a coefficient value of 4,843,087, which means that each married customer will increase the expected amount of credit by Rp4,843,087 compared to other variables, assuming other variables remain constant. As for the second AF group, the coefficient value is 1,642,723.

The same thing is also obtained for customers who are single or unmarried in the first AF group, with a coefficient value of 1,238,437, which means that it will increase the estimated amount of credit by Rp1,104,389 compared to other variables. The single variable for the second AF has no effect on the amount of credit with a p-value of 73%.

The variable effect of male gender on the amount of credit is obtained with a p-value of 0.000 and a coefficient value of 1,223,249 which means that each customer belonging to the male group will increase the estimated amount of credit by Rp1,223,249 compared to other variable categories assuming other variables remain constant. The same results are also obtained for the second AF group, this variable has the same p-value with a coefficient value of 741.343.

In the first AF group, the customer profession included in the employee variable affects the amount of credit with a p-value of 0.000 and a coefficient value of 4,067,615, meaning that each customer who is an employee will increase the alleged amount of credit by Rp4,067,615 compared to other variable categories assuming other variables remain constant. Whereas for the customer profession included in the self-employed variable affects the amount of credit with a coefficient of 3,489,581, meaning that each customer who is an employee will increase the alleged amount of credit by Rp3,489,581 compared to other variable categories assuming other variables remain constant. These results are also obtained for the second AF for customers who fall into the employee group, the coefficient value is 1,656,714 and self-employed with a coefficient value of 1,897,943.

The vehicle model in the first AF group with the LCGC model has a coefficient value of 1,576,707 which means that each customer who chooses the LCGC vehicle model will increase the expected amount of credit by Rp1,576,707 compared to other variable categories with the assumption that the other variables remain constant.

- The SUV model group has a coefficient value of 2,066,777 which means that each customer who chooses an SUV vehicle model will increase the estimated credit amount by IDR 2,066,777 compared to other variable categories assuming other variables remain constant. Meanwhile, for the second AF, the coefficient value is - 3,165,306, which means that each customer who enters the group will reduce the estimated amount of credit by Rp3,165,306, assuming other variables remain constant.
- The TRUCK & PICKUP model group has a coefficient value of -1,816,079 which means that each customer who chooses the TRUCK & PICKUP vehicle model will reduce the estimated credit amount by Rp1,816,079 compared to other variable categories assuming other variables remain constant. In the second AF, this variable has no effect with a p-value of 98%.
- Group models other than LCGC, SUV and TRUCK & PICKUP have a coefficient value of -7,526,679 which means that each customer who chooses a vehicle model other than those mentioned will reduce the estimated amount of credit by Rp7,526,679 compared to other

variable categories assuming other variables remain constant. Meanwhile, for the second AF, the coefficient value is - 8,383,858.

3.1.2. Classical Assumption Test AF ⩽ 300 Million and > 300 Million

By using the complete dataset, it turns out that all classical assumptions are violated, to reduce the saverity (severity) bias due to violations of classical assumptions in this study, the sample is divided into two subsamples.

Table 2. Classical Assumption Test Results AF 300 Million and > 300 Million

Assumptions	AF ≤ 300	AF > 300
Non-multicollinearity	Not fulfilled	Fulfilled
Normality	Not fulfilled	Not fulfilled
Homoscedasticity	Not fulfilled	Not fulfilled

From Table 2, it can be seen that in each sub-sample there are still assumptions that are not met, but some assumptions have been met. In other words, the model with two subsamples is better than the full sample. Therefore, the analysis/discussion is conducted on two subsamples.

3.2. Logistic Regression Analysis of Factors affecting Non-Performing Financing at PT XYZ

Analysis of factors affecting NPF at PT XYZ uses Binary Logistic Regression because the form of data processed is binary data. The results of the binary logistic regression analysis are shown in table 15.

The Robustness Check method for linear regression models obtained robust results can be proven that when research is carried out on full datasets and with AF division (≤ 300 million and > 300 million) has relatively the same results. So, when doing logistic regression analysis, it is not done with AF division.

Based on the table above, the odds ratio value of the Ŷ1 fitted variable is 1.000, which means that changes in the value of the estimated credit amount do not affect the chances of a customer becoming an NPL. According to Wahyudi (2019), an increase in the alleged amount of credit can increase the customer's chance of becoming NPF by 1.004 times. The inflation variable has a negative effect on non-performing financing according to Mazreku et al (2018), from the results of this study it is found that inflation has a real effect on NPF with a p-value of 0.000, the odds ratio value of inflation is 0.816, which means that every 1% increase in the inflation rate, there is a decrease in the chance of 18.4% for a customer to become NPL.

In this study, PT XYZ's customers are divided into seven regions: DKI Jakarta, West Java and Banten, Central Java, East Java and Bali, Kalimantan, Sumatra, and Eastern Indonesia. DKI Jakarta is used as the reference variable for interpreting the odds ratio. The p-value for Eastern Indonesia is 0.732, indicating that this region does not significantly impact the NPF, with an odds ratio of 0.985, meaning the likelihood of an Eastern Indonesia customer becoming NPF is 1.5% lower than that of a Jakarta customer. The odds ratio for the West Java and Banten area is 1.900, indicating a 90% higher likelihood of NPF compared to Jakarta. Central Java has an odds ratio of 1.252, suggesting a 25.2% higher chance of NPF compared to Jakarta. East Java and Bali's odds ratio is 1.217, showing a 21.7% greater chance of NPF than Jakarta. Kalimantan and Sumatra both have an odds ratio of 1.429, meaning a 42.9% higher likelihood of NPF than Jakarta.

The Covid -19 pandemic has a real effect on the NPF status of PT XYZ customers with a p-value of 0.000 and an odds ratio value of 1.865, which means that the chance of a customer during the Covid-19 pandemic to become an NPL is 86.5% greater than before the Covid-19

pandemic. Research conducted by Kryzanowski et al. (2023) also stated the same thing that the covid-19 pandemic had an effect on NPL status.

4. Conclusion

The results of the analysis of this study obtained that the factors that affect the amount of credit are Vehicle Price, Effective Rate, Installment Value per month, amount of downpayment (DP), total financing, tenor, age, education, gender, marital status, occupation and type of unit. The factors of vehicle price, installment value, total financing and tenor have a negative effect on the amount of credit, while other factors have a positive effect on the amount of credit. The Robustness Check method for linear regression models obtained robust results can be proven that when the research is carried out on the full dataset and with AF division (≤ 300 million and > 300 million) has relatively the same results. As such, when doing logistic regression analysis, it is not done with AF division.

Factors that affect the chances of customers becoming NPF are inflation, customer area and the covid-19 pandemic. These factors have a real effect in increasing the chances of customers becoming NPF. The strategy that can be applied by PT XYZ is to be able to better consider the factors that affect NPF on customers and avoid products with low DP and long tenors apart from this data, PT XYZ can also utilise the Financial Information Service System (SLIK) information provided by OJK to obtain additional information about prospective customers.

5. References

Abid, L., Ouertani, M. N., & Zouari-Ghorbel, S. (2014). Macroeconomic and bank-specific determinants of household's non-performing loans in Tunisia: A dynamic panel data. *Procedia Economics and Finance*, *13*, 58–68.

Ahmad, A., Khan, I., Khan, M. T., & Ilyas, M. (2018). The impact of GDP, inflation, exchange rate, unemployment and tax rate on the non performing loans of banks: Evidence from Pakistani commercial banks. *JSSH*, *26*(2).

Apergis, N., Mustafa, G., & Malik, S. (2023). The role of the COVID-19 pandemic in US market volatility: Evidence from the VIX index. *The Quarterly Review of Economics and Finance*, *89*, 27–35.

Ari, A., Chen, S., & Ratnovski, L. (2021). The dynamics of non-performing loans during banking crises: A new database with post-COVID-19 implications. *Journal of Banking & Finance*, *133*, 106140.

Barus, A., Chandra, T. Y., & Sinaulan, R. L. (2022). Analysis of Debtor's Efforts in Settlement or Implementing Credit Obligations During the Non-Natural National Disasters of The Covid-19 Pandemic. *Policy, Law, Notary and Regulatory Issues (POLRI)*, *1*(2), 111–116. https://doi.org/https://doi.org/10.55047/polri.v1i2.178

Benavides-Franco, J., Carabalí-Mosquera, J., Alonso, J. C., Taype-Huaman, I., Buenaventura, G., & Meneses, L. A. (2023). The evolution of loan volume and non-performing loans under COVID-19 innovations: The Colombian case. *Heliyon*, *9*(4).

Dwiputri, A. N. A., & Sampurno, R. D. (2022). Analisis Pengaruh Capital Adequacy Ratio Dan Loan-Todeposit Ratio Terhadap Non Performing Loan Sebelum Dan Sesudah Pandemi Covid-19 (Studi Empiris Pada Bank Konvensional yang Terdaftar di OJK Periode 2018-2021). *Diponegoro Journal of Management*, *11*(6).

Effendhi, H. R. (2019). Analisis Laporan Keuangan Perusahaan Dalam Kaitan Pemberian Kredit Kepada Calon Nasabah (Studi Kasus Pada Pt. Bank Rakyat Indonesia Cabang Nabire Provinsi Papua). *Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis Dan*

Akuntansi, *7*(3).

Fianto, B. A., Maulida, H., & Laila, N. (2019). Determining factors of non-performing financing in Islamic microfinance institutions. *Heliyon*, *5*(8).

Ghulam, Y., Dhruva, K., Naseem, S., & Hill, S. (2018). The interaction of borrower and loan characteristics in predicting risks of subprime automobile loans. *Risks*, *6*(3), 101.

Gorbalenya, A., Baker, S., Baric, R. S., de Groot, R., Drosten, C., Gulyaeva, A. A., Haagmans, B., Lauber, C., Leontovich, A. M., & Neuman, B. W. (2020). The species Severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nature Microbiology*, *5*(4), 536–544.

Huang, J., Kombate, B., Li, Y., Kouadio, K. R., & Xie, P. (2023). Effective risk management in the shadow of COVID-19 pandemic: The evidence of Indonesian listed corporations. *Heliyon*, *9*(5).

Iqbal, J., & Saeed, A. (2023). Managerial sentiments, non-performing loans, and banks financial performance: A causal mediation approach. *Chaos, Solitons & Fractals*, *171*, 113425.

Jalih, J. H., & Rani, I. H. (2020). Respon NPL bank konvensional di Indonesia: Analisis sebelum dan sesudah Pandemi Covid-19 dan penerapan new normal. *Reviu Akuntansi Dan Bisnis Indonesia*, *4*(2), 73–82.

Kryzanowski, L., Liu, J., & Zhang, J. (2023). Effect of COVID-19 on non-performing loans in China. *Finance Research Letters*, *52*, 103372.

Kumar, R. A., Rajendran, R., & Nataraj, B. (2017). Repayment behavior of commercial vehicle loan borrowers with special reference to Namakkal district, India. *Asian Journal of Multidimensional Research (AJMR)*, *6*(11), 93–105.

Kuswahariani, W., Siregar, H., & Syarifuddin, F. (2020). Analisis Non Performing Financing (NPF) secara umum dan segmen mikro pada tiga bank Syariah Nasional di Indonesia. *Jurnal Aplikasi Bisnis Dan Manajemen (JABM)*, *6*(1), 26.

Li, Y. (2021). Gender differences in car loan access: An empirical analysis. *ACM International Conference Proceeding Series*. https://doi.org/10.1145/3481127.3481145

Liu, S., Jin, J., & Nainar, K. (2023). Does ESG performance reduce banks' nonperforming loans? *Finance Research Letters*, *55*, 103859.

Lusian, S., Siregar, H., & Maulana, T. N. A. (2014). Analisis faktor-faktor penyebab pembiayaan bermasalah di bank pembiayaan rakyat syariah XYZ periode 2009-2013. *Jurnal Keuangan Dan Perbankan*, *16*(1).

Mappamiring, P., & Lalo, A. (2023). Pengaruh Perencanaan Pajak Terhadap Manajemen Laba Pada Perusahaan Non Finansial Yang Terdaftar Di Bursa Efek Indonesia Tahun 2019-2021. *Wawasan: Jurnal Ilmu Manajemen, Ekonomi Dan Kewirausahaan*, *1*(1), 142–155.

Mazreku, I., Morina, F., Misiri, V., Spiteri, J. V, & Grima, S. (2018). *Determinants of the level of non-performing loans in commercial banks of transition countries*.

Mubaroq, I., Arofah, I., & Rusdiana, Y. (2022). Faktor-Faktor Profilling Customer Terhadap Resiko Kualitas Pembayaran Kredit Mobil Dengan Menggunakan Metode Analisis Faktor. *Prosiding SEINTEK Universitas Pamulang*, *1*(2), 380–393.

Murthy, U., Kamil, N. M., Mariadas, P. A., & Devi, D. (2017). Factors influencing non-performing loans in commercial banks: The case of banks in Selangor. *International Journal of Business and Management*, *12*(2), 246–255.

Naveed, H. M., HongXing, Y., Memon, B. A., Ali, S., Alhussam, M. I., & Sohu, J. M. (2023). Artificial neural network (ANN)-based estimation of the influence of COVID-19 pandemic on dynamic and emerging financial markets. *Technological Forecasting and Social Change*, *190*, 122470.

Nugraheni, N., & Aziza, Q. A. (2020). The existence of collateral in credit through peer-to-peer lending services. *Yustisia Jurnal Hukum*, *9*(1), 98–115.

Park, C.-Y., & Shin, K. (2021). COVID-19, nonperforming loans, and cross-border bank lending. *Journal of Banking & Finance*, *133*, 106233.

Prasad, R., & Mathur, Y. B. (2022). Market design principles for the securitisation of non-performing loans. *IIMB Management Review*, *34*(4), 392–404.

Ridfa, C., Azam, A. N., & Hendro, S. (2018). The impact of demographic and macroeconomy factors the non-performing loan in property sector. *Russian Journal of Agricultural and Socio-Economic Sciences*, *78*(6), 257–266.

Rothan, H. A., & Byrareddy, S. N. (2020). The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of Autoimmunity*, *109*, 102433. https://doi.org/10.1016/j.jaut.2020.102433

Santoso, M. H., Siregar, H., Hakim, D. B., & Siregar, M. E. (2019a). Determinants of Islamic Bank Non-Performing Financing By Financing Contract (Case Study: Bank BRIsyariah Private Company). *Indonesian Journal of Business and Entrepreneurship (IJBE)*, *5*(1), 77.

Santoso, M. H., Siregar, H., Hakim, D. B., & Siregar, M. E. (2019b). Strategy for non-performing financing management in Sharia banks based on economic sector of financing. *Open Journal of Business and Management*, *7*(02), 374.

Sekyi, S. (2017). Rural households' credit access and loan amount in Wa Municipality, Ghana. *International Journal of Economics and Financial Issues*, *7*(1), 506–514.

Serrano, A. S. (2021). The impact of non-performing loans on bank lending in Europe: An empirical analysis. *The North American Journal of Economics and Finance*, *55*, 101312.

Simatupang, A., Yanti, E. R., & Mardila, N. (2021). Manajemen Kredit Pemilikan Rumah Untuk Meminimalisir Kredit Macet Pada PT Bank Tabungan Negara (PERSERO) Tbk. *AdBispreneur: Jurnal Pemikiran Dan Penelitian Administrasi Bisnis Dan Kewirausahaan*, *6*(1), 13–25.

Sudiarto, S., Singandaru, A. B., & Suryantara, A. B. (2022). Subsidized Home Ownership Credit Agreement at the Mataram Branch of PT. Bank Tabungan Negara. *Unram Law Review*, *6*(2).

Wahyudi, T. (2019). Analisis Faktor-Faktor yang Memengaruhi Non Performing Financing di PT TAF dan Pengendaliannya. *Jurnal Manajemen Dan Organisasi*, *10*(2), 72–91.

Wu, Z., & McGoogan, J. M. (2020). Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *Jama*, *323*(13), 1239–1242.

Yurttadur, M., Celiktas, E., & Celiktas, E. (2019). The place of non-performing loans in the Turkish banking sector. *Procedia Computer Science*, *158*, 766–771.

Zhang, C., Shi, L., & Wang, F.-S. (2020). Liver injury in COVID-19: management and challenges. *The Lancet Gastroenterology & Hepatology*, *5*(5), 428–430.