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Determinants of the Extent of Individual Credit Rationing: A Case Study of Can Tho Military Commercial Joint Stock Bank, Vietnam

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Abstract

The aim of this paper was to analyze the determinants of the extent of individual credit rationing at Can Tho Military Commercial Joint Stock Bank (MB). The data was collected from 150 customers according to the systematic random sampling method listed in the bank. This study employed quantitative analysis methods, and Tobit regression model, to test the proposed hypotheses. The results showed that the average loan amount of an individual customer was 1,181.3 million VND, the average credit limit was 48.6%, and the average interest rate was 10.9% per year. Most of the individual customers borrowed money to buy properties. In addition, the analysis results also indicated that individual borrowers still faced some difficulties in accessing bank credit, such as cumbersome procedures, long waiting times, insufficient collateral assets, and loan documents. The results of the Tobit model pointed out that there were five factors affecting the degree of credit rationing to individual customers at the bank, including (1) Collateral, (2) Income, (3) Credit history, (4) Loan purpose, (5) Relationship between borrower and bank. Based on the empirical findings, the possible solutions for the bank and individual borrowers to improve credit efficiency for individual customers at commercial banks are obtained.

Keywords: Credit Rationing, Individual Customer, Tobit Model, Micro Determinants

JEL Classification Code: E51, G21, G51

1. Introduction

The credit function is one of the main profit-making activities for commercial banks. Arcand et al. (2017) recognized service quality as one of the concepts to achieve customer satisfaction. Santos (2003) stated that service quality is a significant determinant of internet commerce since online comparison of technical characteristics of products are essentially costless and feasible. In the context

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of mobile banking, mobile service quality is defined as the clients' overall evaluation and judgment of the excellence and quality of the mobile banking service offerings (Jun & Palacios, 2016). Banks often provide credit to customers who are organizations and individuals loans, discounts, factoring, etc. Credit granting is done based on the trust, credibility, and the expected results of the business plan, etc. However, the problem of controlling information has caused obstacles for banks to carry out the credit process and difficulties for customers bank loans' accessibility.

Military Commercial Joint Stock Bank of Vietnam (MB) is a commercial bank operating for profit. Like other banks, MB always faces many risks in offerring credit to customers, especially individual customers. Bank credit to individual customers increased continuously over the years from 12.4% of total outstanding loans in 2012 to 37.7% in 2018 (equivalent to 81,011 billion VND). Lending to individual customers is a key segment that has helped MB's outstanding loan growth in recent years. In, about 50% of these loans are mortgage loans, 20% are car loans, and the rest are loans like MCredit (approximately 7%), MBS (nearly 3%), credit card loans, and other loans. The strong shift to the retail segment

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with home loans, car loans, credit card loans, and especially unsecured loans will increase credit risk for MB. Currently, MB's non-performing loan ratio is always under control. However, currency trading is a high-risk field; some risks cannot be fully controlled, such as customer dishonesty, improper use of borrowed capital, capacity, and quality of credit officers when evaluating collateral assets. All of these potential issues may increase credit risk for the bank, which in turn increases costs and reduces the bank's profitability, efficiency, and reputation.

To mitigate the bank's credit risk, the bank has selected customers and has provided loans with stricter regulations and loan conditions. This constraints the individual customers to access bank credit. Besides that, individual customers have different resources, so their abilities to access credit are also different and affected by many different factors such as collateral assets, credit history, and income of the borrower. Therefore, the research on factors affecting credit rationing to individual customers at MB - Can Tho branch aims to investigate the determinant factors of the degree of credit rationing to individual customers, thereby proposing several solutions to improve the credit efficiency of the bank and the possibility of accessing bank credit of individual customers.

2. Literature Review

There have been many domestic and foreign studies on the degree of credit rationing for small and medium-sized enterprises (SMEs) as well as for households. For individual customers, since these borrowers have different resources, their abilities to access bank credit are different and are influenced by many factors. In this study, a review of some previous research papers on the bank credit rationing to individual customers under different aspects, such as difficulties in accessing bank credit faced by individual customers and factors influencing the level of credit rationing to individual customers have been discussed.

Firstly, SMEs face many obstacles in accessing financing for profitable investment opportunities due to a lack of credible information about themselves. Lenders are often reluctant to make small business loans because SMEs may not have reliable track records, sufficient financial information, or business plan (Berger & Udell, 2002). In Vietnam, these firms are also faced with great difficulties. It is reported there are still 70% of SMEs unable to access or obtain bank loans; among Vietnamese SMEs applying for formal credit, only 10.5% successfully obtain funds that fully satisfy their demand, and a large part manage to obtain only 25% or half of their need (Nguyen et al., 2019).

In addition, the firm size has been considered in previous studies. Beck and Demirguc-Kunt (2006) reported that SMEs suffer from greater financing obstacles such as collateral, bureaucracies, or connections than large firms, and the effect of such obstacles on firm growth is much more severe for SMEs. Similarly, in a study based on direct evidence on whether firms' demand was satisfied in the formal credit market in six African countries, Bigsten et al. (2003) find micro and small firms are much less likely to get a loan than large firms. For Vietnamese SMEs, the current literature is mixed. While Malesky and Taussig (2009), Nguyen and Ramachandran (2006), and Rand (2007) found evidence that firm size is positively associated with access to bank loans, Nguyen et al. (2019) indicated large firms have a significantly higher likelihood of being credit constrained than smaller businesses. Firm age is also considered a proxy for information asymmetries. Creditors do not often have much time to evaluate newly-established firms, nor do such firms build long-term relationships with suppliers of finance that can show their credit quality (Oliner & Rudebusch, 1992).

Furthermore, Kira and He (2012) has contributed to our knowledge on the series of factors associated with the firms' characteristics impacts on access to debt financing from different external sources of financing in Tanzania. The findings indicated that there is interdependence and significant relationship between the firms' characteristics (location, industry, size, incorporation, age, size, availability of business information and collateral) and access of debt to financing by SMEs. In addition, Byiers et al. (2010) showed that well-established firms are easier to monitor and thus more likely to have access to bank finance or face fewer constraints. However, based on data on SME financing in Malaysia, Abdullah (2011) finds that there is no statistically significant correlation between SMEs' age and their credit accessibility. Similar results are documented in the studies of Nguyen et al. (2019), and Malesky and Taussig (2009) on Vietnamese SMEs. Berger and Udell (2002) reported that the lack of audited financial statements also causes SMEs to suffer from information asymmetry and thus credit rationing. According to Beck et al. (2018), banks are often discouraged from lending to SMEs due to the relatively limited reliable information. Kira and He (2012) argued that financial statements issued by firms provide creditors with information to evaluate performance and determine repayment ability; as a result, firms with unclear or hidden financial information are more likely to rely on informal credit. Thus, having financial information checked by external auditors is negatively related to the likelihood of being credit rationed (Drakos & Giannakopoulos, 2011).

Secondly, individual customers have been mentioned in various studies. Nguyen (2016) investigated the development of mortgage lending for individual customers of Joint Stock Commercial Bank for Investment and Development of Vietnam. The author affirmed that lending mechanisms and policies have not met customer demands, and administrative procedures related to credit granting are cumbersome (many

documents and many forms of credit granting, especially documents of collateral assets), which has caused difficulties for customers. In addition, at the request of the bank, for customers to be able to access loans, customers must be eligible for getting loans and must prepare the required documents, so it takes time for them to complete the loan application. Besides that, the mortgage lending policy for individual customers is not reasonable compared to the needs of customers, as shown by the low lending amount and short loan term. In the form of unsecured loans for employees, the maximum loan amount is usually 50 million VND, and the maximum loan term is 36 months. Additionally, satisfying other necessary conditions have also caused difficulties for many customers. Besides, the financial capacity of customers is often difficult to determine and can be highly volatile because most borrowers lack asset management skills, and income is greatly affected by health, production, business situation, unusual expenses, and marital status. In addition, Tran and Thai (2013) identified factors impacting the household's ability to access consumer credit at commercial banks. The research results stressed that the education level of the household head and the household's income are important factors that determine the household's ability to borrow capital.

Through a comprehensive review of prior studies related to the research topic, the authors found the main difficulties that individual customers still face when they want to access loans in Vietnam, including the complicated bank loan procedures, limited lending policies for individual customers, and limited consumer loan products. Besides that, customers must meet the requirements for loans according to the bank's regulations, such as valuable collateral assets, suitable loan

purposes, guaranteed income, appropriate age, etc. Previous studies have also shown that many factors have strong impacts on the degree of credit rationing to individual customers, such as collateral, income, education level, age, occupation, etc. Which the financial factor is the most important factor for the bank to approve the loan of individual customers. The factors affecting credit rationing to individual customers are summarized in Table 1 as follows.

Decisive factors of the degree of credit rationing to individual customers are classified into 3 groups, including factors of the individual's financial ability, factors related to credit, and demographic factors. This study employs the Tobit regression to analyze the factors impacting the level of credit rationing to individual customers at the MB – Can Tho branch. The authors use the level of credit rationing to individual customers as the dependent variable and use factors of financial ability (collateral assets, customer's income), credit-related factors (customer's credit history, loan purpose), and demographic factors (customer's age, educational level, relationship with bank) as independent variables.

3. Research Methodology

3.1. Sample Selection

Secondary data is collected from financial statements and internal reports of the MB - Can Tho branch in the period from the year 2017 to the year 2019. The study also gathers primary data by applying the systematic random sampling method with k step based on the customer list at MB - Can Tho branch. The selected observations are individual

Table 1: Summary of Factors Affecting the Degree of Credit Rationing to Individual Customers in Prior Studies

Variables	Previous Study	Impact Direction
Collateral assets	Nguyen and Pham (2010); Nguyen (2016)	(-)
Age of borrower	Pearce (1985); Pham and Izumida (2002); Nguyen (2016)	(-)/(+)
Income of borrower	Pearce (1985); Tran and Thai (2013); Phan et al. (2014); Nguyen (2016)	(-)
Relationship with bank	Nguyen (2016)	(-)
Gender of borrower	Pham and Izumida (2002);	(-)
Certificate of land use right	Le and Nguyen (2008)	(-)
The educational level of the borrower	Tran and Thai (2013);	(-)
Occupation	Tran and Huynh (2013); Nguyen (2016)	(-)
Credit history	Ata et al (2015)	(+)
Loan purpose	Akpandjar et al., 2013	(-)
Number of dependents	Tang and Guo (2017)	(+)
Loan duration	Nguyen (2016)	(-)

customers who applied for a loan at MB - Can Tho branch in the year 2019.

Tabachnick and Fidell (1996) pointed out that when using regression methods, the required sample size is calculated by the formula: $n \geq 50 + 8p$, where n is the required minimum sample size, p is the number of independent variables in the model. Thus, with 7 independent variables in the proposed research model, the minimum sample size to be investigated is $50 + 8 \times 7 = 106$ observations. Based on the formula for calculating sample size, objective and subjective conditions, the sample of 150 observations have been collected.

3.2. Estimation Method

To assess the credit situation of individual customers at MB - Can Tho branch, the study employs a descriptive statistical analysis. This is an analytical method based on the synthesis of methods of measuring, describing, and presenting data by using calculations and common statistical indicators such as mean, median, variance, standard deviation, etc., for continuous variables and ratios for discontinuous variables. This method is applied to the field of economics and business by drawing conclusions based on data and information collected under conditions of uncertainty.

Besides, the Tobit regression model is applied to analyze the factors affecting the level of credit rationing to individual customers at the bank. This model is used to study the correlation relationship between the dependent variable and the independent variables. Given model is also known as a censored regression model or a limited dependent variable regression model because of several observations of the dependent variable (y_i^*) are blocked or restricted.

The objective of the study is to estimate the parameters β_i and σ. The Tobit regression model is presented as follows:

$$y = \begin{cases} Y_i = \beta x_i + u_i & if \ y_i^* > 0 \ \text{with} \ u_i \sim IN\,(0, \sigma^2) \\ 0 & if \ y_i^* \leq 0 \end{cases} \quad (1)$$

Lastly, the possible recommendations have been proposed to improve credit efficiency for individual customers at MB - Can Tho branch.

3.3. Proposed Research Model

Accorrding to previous studies, a research model factors affecting credit rationing to individual customers at MB - Can Tho branch are proposed to include seven independent variables collateral, income, credit history, loan purpose, age, educational level, the relationship between customer and bank and one dependent variable as the degree of credit rationing to individual customers at MB - Can Tho branch. Seven independent variables are divided into 3 groups of factors, consisting of factors of financial ability (collateral assets, customer's income), factors related to credit (customer's credit history, loan purpose), and demographic factors (customer's age, educational level, relationship with bank). Based on the empirical findings of prior studies, the proposed research model is presented in the Figure 1.

This paper employs the Tobit regression model to investigate the determinant factors of the extent of credit rationing to individual customers at the MB – Can Tho branch. The estimation equation is shown as follows:
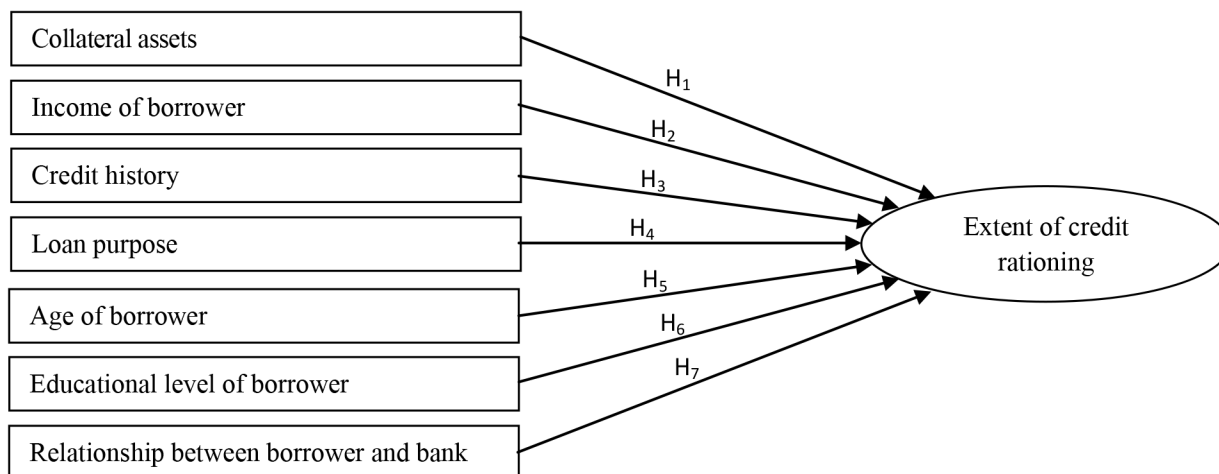

Figure 1: Theoretical Model

$$
\begin{aligned}
RATIONING_i = {} & \alpha + \beta_1\,COLLATERAL_i + \beta_2\,INCOME_i \\
& + \beta_3\,HISTORY_i + \beta_4\,PURPOSE_i \\
& + \beta_5\,AGE_i + \beta_6\,EDU_i \\
& + \beta_7\,RELATIONSHIP_i + \varepsilon_i
\end{aligned} \quad (2)
$$

Table 2 summarizes characteristics of the variables in the research model and the expected signs of the determinants of credit rationing to individual customers at the MB – Can Tho Branch.

4. Results and Discussion

4.1. Economic - Social Characteristics of Individual Customers in the Study

Through the process of collecting and synthesizing survey data of 150 individual customers at MB - Can Tho branch, key characteristics of the research subjects are presented in Tables 3 and Table 4 as follows.

Based on the statistical results in Table 3, the average age of individual borrowers in the study is 42–43 years old. This is the age of whom have a high demand for loans to invest in production and business, buy a house or consume. The oldest borrower is 71 years old, whereas the youngest is 28 years old. The standard deviation is 10.1, indicating that the clients have little age difference. In addition, the results in Table 3 also show that the average education level of personal customers at the MB - Can Tho branch is 15.2 schooling years. With a high level of education, borrowers can easily learn and quickly grasp information, and access improvements in information technology such as making loan documents, and implementing the loan process at the bank. The borrower with the highest educational level has 18 schooling years (equivalent to a master's degree), and the lowest one has 12 schooling years (equivalent to junior high

Table 2: Summary of the Variables in the Research Model

Variables	Measurement Method	Unit	Expected Sign
Extent of credit rationing (RATIONING)	{1 - (Obtained loan amount / Wanted loan amount)} x 100%	%	
Collateral assets (COLLATERAL)	Collateral / Wanted loan amount	Times	(-)
Income of borrower (INCOME)	Average monthly income of a borrower	Million VND	(-)
Credit history (HISTORY)	Dummy variable, 1 = Has incurred overdue debt, 0 = Has never incurred overdue debt	Dummy	(+)
Loan purpose (PURPOSE)	Dummy variable, 1 = Procurement of assets with documents proving the loan purpose (purchase and sale contracts, construction contracts, cost estimate document), 0 = Other loan purposes	Dummy	(-)
Age of borrower (AGE)	Age of borrower	Year	(-)
The educational level of the borrower (EDU)	The number of schooling years	Year	(-)
Relationship between borrower and bank (RELATIONSHIP)	Dummy variable, 1 = Has relative working at the bank or has a close relationship with a bank employee, 0 = Has no relationship with a bank employee	Dummy	(-)

Table 3: Age, Educational Level, and Income of Individual Customers in the Study

Criteria	Unit	Mean	Standard Deviation	Minimum	Maximum
Age of borrower (AGE)	Year	42.5	10.1	28.0	71.0
Educational level of borrower (EDU)	Year	15.2	1.7	12.0	18.0
Income of borrower (INCOME)	Million VND	14.7	8.3	6.0	50.0

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school). The standard deviation is 1.7 years, indicating a low disparity in educational level among clients. Besides that, an important criterion that needs to be considered when studying the factors affecting the degree of credit rationing to personal borrowers is the average monthly income of the customer. The average monthly income of individual customers in this study is 14.7 million VND per month. The borrower with the highest income earns 50 million VND per month, the lowest earns 6 million VND per month. The standard deviation is 8.3 million VND per month, showing that the difference in income among customers is not too high.

Table 4 presents statistical results on the gender and occupation of respondents. In terms of gender, of survey subjects, female clients make up the majority of the sample with 86 people (equivalent to 57.3%), and the male customers are account for 64 people, equivalent to 42.7%. Although there is a difference in the number of men and women in the study sample, this difference is not large. Moving to the occupation of the respondents, the statistical results in Table 4 show that businesspeople account for the highest proportion with 43 persons (equivalent to 28.7%). Freelancers make up the second-highest proportion with 36 clients (equivalent to 24%), followed by officers with 26 borrowers (equivalent to 17.3%). The group of civil servants/public employees constitutes 11.3% of the total number of clients. Housewives, workers, and people with other occupations account for 8%, 6%, and 4.7%, respectively.

4.2. Loan Status and the Extent of Credit Rationing of Surveyed Individual Customers

Table 5 demonstrates the borrowers' loan situation, level of credit rationing, lending interest rate, and collateral assets at the MB - Can Tho branch.

Table 5 indicates that the wanted loan amount of individual borrowers ranges from 350 to 4,500 million VND. The average wanted loan amount is approximately 2,310.3 million VND. The standard deviation of the wanted loan amount is 1,195.5 million VND. In terms of the obtained loan amount, the average obtained loan amount is 1,181.3 million VND with a standard deviation of 827.1 million VND. The highest amount that individual customers can borrow at a bank is 4,200 million VND. However, several customers get rejected for a loan.

From the information about the wanted loan amount and the obtained loan amount of the borrowers, the authors calculate the extent of credit rationing by using the formula: 1 - (Wanted loan amount / Obtained loan amount). The results in Table 5 show that the average degree of credit rationing for individual customers at MB - Can Tho branch is 48.6%, the highest level is 100% (in case a customer gets rejected for a loan), and the lowest is 0% (in case a customer can borrow full amount that the customer wants to borrow). The standard deviation of the credit rationing is 21.2%.

Collateral is an important criterion when banks consider lending to customers. Collateral is expressed through the ratio of collateral value to the customer's desired loan amount. The

Table 4: Gender and Occupation of Individual Customers in the Study

Criteria	Number of borrowers	Proportion (%)
Gender of borrower		
Male	64	42.7
Female	86	57.3
Occupation of borrower		
Housewife	12	8.0
Civil servants / Public employees	17	11.3
Freelancer	36	24.0
Worker	9	6.0
Businessperson	43	28.7
Officer	26	17.3
Other	7	4.7
Total	**150**	**100.0**

Table 5: Loan Amount, the Extent of Credit Rationing, Lending Interest Rate, Collateral Assets of Personal Loan in the Study

Criteria	Unit	Mean	Standard Deviation	Minimum	Maximum
Wanted loan amount	Million VND	2,310.3	1,195.5	350.0	4,500.0
Obtained loan amount	Million VND	1,181.3	827.1	0.0	4,200.0
The extent of credit rationing (RATIONING)	%	48.6	21.2	0.0	100.0
Collateral assets (COLLATERAL)	Times	1.9	0.5	1.3	3.0
Lending interest rate	%	10.9	1.3	9.0	12.0

higher this ratio, the lower the risk of the loan. The results in Table 5 show that the average collateral ratio of individual customers in this study is 1.9 times with a standard deviation of 0.48 times. The highest ratio is 3 times; the lowest is 1.3 times. Moving to lend interest rate, the average interest rate for personal loans at MB - Can Tho branch is 10.9% per year. The lowest lending interest rate is 9% per year, and the highest is 12% per year. The standard deviation of the lending interest rate is 1.3% per year.

Table 6 presents credit history, loan purpose, the relationship between customer and bank, as well as difficulties in accessing bank credit.

Table 6 point out that 47 out of 150 customers used to have overdue debt in their credit history. When a customer has made a late payment in the past, this may reduce the customer's reputation, and the possibility of a customer's credit rationing might increase as the bank is afraid that the customer will repeat that behavior in the future. The remaining customers have never incurred overdue debt, corresponding to 68.7% of the total sample. Regarding the loan purpose factor, the results in Table 6 indicate that the majority of individual customers borrow money at MB - Can Tho branch to purchase assets with documents proving the loan purpose, such as purchase contracts, construction contracts, cost estimate documents, etc. In fact, most personal customers borrow money for the purpose of buying a house, land, or car. In recent years, the real estate market in Can Tho has developed, and the demand for buying cars by residents has increased sharply. The remaining customers borrowed money with the aim of consumption.

In terms of the factor of the relationship between customer and bank, the survey results in Table 6 show that out of 150 surveyed individual customers, 51 borrowers have relatives who are working at the bank or have a close relationship with bank staff (equivalent to 34%), the remaining 99 customers (equivalent to 66%) access to bank loans without any acquaintanceship with the bank before. The study also collects information about the difficulties that individual customers face when getting loans at banks. The research results stress that cumbersome procedures, long waiting times, insufficient collateral, and incomplete loan documents required by banks are often the main difficulties that customers have encountered when accessing loans at MB - Can Tho branch. Hence, an attempt by the bank to improve these factors to make it easier for customers to access bank credit.

4.3. Determinants of Credit Rationing to Individual Customers at MB – Can Tho Branch

The study uses the Tobit regression model to examine the influence of factors on the degree of credit rationing to individual customers at the MB - Can Tho branch. Estimated results by using the Tobit regression method are presented in Table 7.

Table 6: Loan Characteristics and Difficulty in Accessing Bank Credit

Criteria	Number of Borrowers	Proportion (%)
Credit history (HISTORY)		
Has incurred overdue debt	47	31.3
Has never incurred overdue debt	103	68.7
Loan purpose (PURPOSE)		
Procurement of assets with documents proving loan purpose	113	75.3
Other purposes	37	24.7
Relationship between borrower and bank (RELATIONSHIP)		
Has relative working at the bank or has a close relationship with the bank employee	51	34.0
Has no relationship with the bank employee	99	66.0
Difficulty in accessing bank credit		
Cumbersome procedures	58	38.7
Long waiting time	23	15.3
Lacking collateral	47	31.3
Lacking documents	22	14.7
Total	**150**	**100.0**

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Table 7: Estimated Results using Tobit Regression Method

Variables	Estimated Coefficient
COLLATERAL	−0.161***
INCOME	−0.006***
HISTORY	0.105***
PURPOSE	−0.087**
AGE	−0.001
EDU	−0.016
RELATIONSHIP	−0.064*
Constant	0.734
Number of observations	150
Log-likelihood value	6.072
Prob > χ^2	0.000
LR Chi-square	54.26

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

The results by Pearson correlation indicates that all the pairs of correlation coefficients among the variables in the model are less than 0.8 (Farrar & Glauber, 1967). Hence, it can be concluded that there is no serious multicollinearity phenomenon. In addition, the LR Chi-square value is 54.26 at a significance level of 0.000, indicating that the regression model is suitable. Out of the seven factors included in the model, five factors are statistically significant, including collateral, income, credit history, loan purpose, and close relationship to the bank. In which collateral, income, loan purpose, and acquaintanceship with the bank have negative relationships with the extent of credit rationing. The strong impacts of collateral assets (COLLATERAL), the income of the borrower (INCOME), the credit history (HISTORY), loan purpose (PURPOSE), and the relationship between borrower and bank (RELATIONSHIP) on the level of credit rationing (RATIONING) can be explained as follows.

As expected, a negative relationship between collateral assets (COLLATERAL) and the level of credit rationing exists. This means that the higher the collateral ratio, the higher the liability of individual customers, and the lower the bank's credit risk, so the bank has less credit rationing for these loans. Besides that, collateral is also considered a second source of debt repayment when a customer is unable to repay a loan when the loan is due. Thus, when the ratio of collateral value to the wanted loan amount is low, and the value of collateral assets is not enough to secure a loan, the bank often refuses to lend or only lends an amount lower than the wanted loan amount of the customer. This is clearly shown through the research results in Table 7 that the estimated coefficient is negative (β_1 = −0.161) at the

significance level of 1 percent. This empirical finding is in accordance with the results of previous studies conducted by Nguyen and Pham (2010), and Nguyen (2016).

From the estimated results in Table 7, it can be seen that the income of the borrower (INCOME) negatively affects the degree of credit rationing with the negative estimated coefficient (β_2 = −0.006) at the significance level of 1 percent. The income variable represents the average monthly income of a borrower. Customer's income includes salary, income from business results, and other income. The borrower's income is the source for loan repayment. Stable and high income is considered a source of available debt payment for loans at banks. The higher the income, the higher the customer's ability to repay debt, so the level of credit rationing decreases. This result is consistent with previous studies such as Pearce (1985), Tran and Thai (2013), Phan et al. (2014), and Nguyen (2016).

A positive relationship between credit history (HISTORY) and the extent of credit rationing exists, which is clearly shown through the research results in Table 7 that the estimated coefficient is positive (β_3 = 0.105) at the significance level of 1 percent. This finding proves that when a customer has a bad credit history, the customer's credit reputation will be underestimated by the bank, and the bank will increase the level of credit rationing for this customer. In contrast, individual borrowers with a good loan repayment history will easily get a loan from the bank, and the credit rationing for these customers will be low. This result is completely consistent with the original hypothesis of Ata et al (2015).

Loan purpose (PURPOSE) negatively influences the extent of credit rationing. This can be seen from the results in Table 7; loan purpose variable has a negative correlation with credit rationing at the significance level of 5 percent ($\beta4$=-0.087). When getting a loan for the purpose of purchasing properties with clear proof of purpose, individual customers can easily prove to the bank the loan purpose. When the loan purpose is clear, the bank's credit risk declines, thereby reducing the credit rationing to individual customers, so customers can borrow a large amount of money.

Table 7 shows the relationship between borrower and bank (RELATIONSHIP) that has a negative relationship with the degree of credit rationing with the negative estimated coefficient (β_7 = −0.064) at the significance level of 10%. This means that borrowers who have relatives or close friends working at MB - Can Tho branch have lower credit rationing, these customers' loan amount is more close to the expected level. This is because relatives or close friends who work at the bank can fully understand the bank's regulations, so customers can receive useful advice, support, and guidance throughout the loan process. Besides that, through the relationship between borrower and bank staff, the bank can have more information about these customers

to make the better lending decision and the bank are more willing to grant loans to these borrowers. This empirical finding is consistent with the study of Nguyen (2016).

Unfortunately, the study has not found the influence of the age of the borrower (AGE), and the educational level of the borrower (EDU) on the degree of credit rationing (RATIONING) in the study area. In addition, Table 7 indicates that the age of the borrower (AGE), and the educational level of the borrower (EDU) have negative impacts on the level of credit rationing, even though these relationships are not statistically significant since P-values are greater than 10 percent. The bank does not consider the age factor when making a lending decision to individual customers. At each age, customers have their own advantages. Particularly, young customers can grasp new information and new techniques to find business opportunities to generate high income, and older customers have more experience, more acquaintanceships, etc. Therefore, if the bank uses age as one of the criteria to decide the credit rationing to customers, it is not appropriate in practice. Besides that, the bank does not consider the educational level factor when making a lending decision to personal borrowers. A high or low level of education does not have much impact on whether a customer will repay the debt on time or not, nor does it determine a customer's income level, so the bank often does not consider this factor when granting a loan to clients.

5. Conclusion and Recommendations

5.1. Conclusion

The study aims to analyze the factors affecting the level of credit rationing to individual customers, thereby proposing recommendations to improve the credit efficiency of individual customers at the MB - Can Tho branch. In order to reach given aims, the Tobit model is used. Through the process of surveying loan documents and conducting a survey of 150 personal borrowers who have applied for a loan at MB - Can Tho branch, the authors have drawn several important results as follows:

Firstly, the observed loan amount has partly met the borrowing needs of individual customers in Can Tho city with an average loan amount of 1,181.3 million VND and an average credit rationing of 48.6% and an average interest rate is 10.9% per year. Most individual customers borrow money at MB - Can Tho branch to purchase assets with documents proving the loan purpose, such as purchase and sale contracts, construction contracts, cost estimate documents, etc. Most respondents have borrowed money to buy a house, land, or car in recent years. The real estate market in Can Tho has developed, and the demand for driving a car in Can Tho city has also increased sharply. In addition, the research results show that during the loan process at MB - Can Tho branch,

individual customers face some difficulties in accessing credit, such as cumbersome procedures, long waiting times, insufficient collateral, and incomplete documents required by the bank.

Besides, the results of the regression model point out that collateral, income, credit history, loan purpose, and the relationship between borrower and bank are significantly effect on the extent of credit rationing to individual customers at MB - Can Tho branch. More specifically, collateral, income, loan purpose, and acquaintanceship with banks are negatively influence the degree of credit rationing, while credit history has a positive correlation with credit rationing to the individual borrower. However, the study has not found the impacts of the age of the borrower (AGE), and the educational level of the borrower (EDU) on the degree of credit rationing in the study area.

5.2. Recommendations

Based on the research results, the authors have proposed several recommendations for both MB – Can Tho branch and individual customers to help these borrowers access bank credit, thereby reducing the credit rationing.

For MB - Can Tho branch, the bank should change its collateral evaluation policy to objectively evaluate collateral in line with market prices. The bank should simplify lending processes and regulations. The bank should focus on training and development of human resources by regularly organizing training courses to foster and improve professional qualifications, consulting skills, negotiation skills, and communication skills for the bank staff to show a professional manner when meeting customers and to promptly grasp the needs of customers. The bank should focus on risk management in all activities, monitor the maintenance and effectiveness of the quality management system for banking services, and strengthen inspection and supervision of all activities to ensure safety and high security for customers as well as for the bank. The bank should make changes in lending policy such as extending the loan term according to the regulations of the State Bank. According to Circular 11 of the State Bank of Vietnam (2021), the maximum loan term with a fixed interest rate is 10 years. Meanwhile, commercial banks in Can Tho city often apply the fixed loan interest rate for 3 years. Therefore, MB - Can Tho branch should increase the loan term with a fixed interest rate from 7-10 years. In addition, the bank should diversify lending products to expand the customer base, and expand the lending market, thereby increasing profit and improving the efficiency of lending activities.

For individual customers, to help borrowers mitigate their credit rationing, they should fully declare their income when submitting loan applications because income is one of the determinant factors of credit rationing. Customers should

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actively declare all income sources such as salary, property rental, dividend, profit from the business, etc. Borrowers should use assets with a high percentage of residential land, car, or savings as collateral to secure a loan. For loans with a large amount, customers should increase the loan term as increasing the loan term can reduce the monthly loan payment. This helps ensure the ability to repay the loan and avoid late repayment. After getting a loan, if a customer wants to fully pay off the loan, the customer does not need to worry about having to pay interest for the rest loan period because MB - Can Tho branch only charges interest until the date when a customer pays off the loan. The bank also has a free preferential package for early repayment if a customer's loan term is three years or more.

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