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Factors Affecting the Ability to Repay Debts of Corporations at Commercial Banks

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Abstract

This study aims to estimate the influence of these factors on the ability of corporations to repay debts at commercial banks in Vietnam, especially in Ho Chi Minh City. Moreover, this study focuses on the period from 2018 to 2022. Hence, the effects of the COVID-19 pandemic were also examined in this study. In addition, this study employs a binary logistic regression method to analyze the extent of the factors' impact on the ability of corporate customers to repay debts. The results reveal that the model includes six statistically significant factors: collateral, loan term, income, firm size, leverage, net sales, and COVID-19. Furthermore, the model can be used to forecast corporations' ability to repay debts, which could help commercial banks plan their loan strategies for corporate customers based on the significant results of the Hosmer-Lemeshow test. The study, on the other hand, only focused on some banks in the biggest city in the south of Vietnam, so further research on the area is needed, such as over Vietnam.

Keywords:

Debts; Binary Logistic; Commercial Bank; Corporation; Repay.

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1- Introduction

Credit granting is the credit institution accepting individuals and corporations that use the money under the principle of repayment (involving the principal and interest) through lending, discounting, financial leasing, banking guarantees, and other operations [1]. Based on the definition of credit granting, lending to businesses is crucial for promoting production development, contributing to currency and price stability, stabilizing lifestyles, creating employment opportunities for workers, and maintaining social order and security.

The development of various business forms in the context of globalization has facilitated access to diverse funding sources from commercial banks. Although credit activities generate substantial profits for banks, they also create significant risks owing to the financial distress of customers, leading to pressure to repay the principal and interest on loans. Consequently, risks of default and loss of repayment capacity may arise, causing commercial banks to confront credit risks. To mitigate credit risks and ensure credit quality, banks need to have policies to control loan disbursements and implement tools to assess customer repayment ability. Assessing customers' repayment ability relies not only on the business plans, production projects, and financial information provided by customers but also on factors such as business characteristics, loan duration, and macroeconomic environmental factors. These are also key factors influencing the repayment capacity of customers under normal market conditions, as demonstrated in studies by [2–9].

Amid the COVID-19 pandemic, disruption of the global value chain has posed challenges to the financial system, particularly affecting the commercial banking sector. This triggered an economic recession, heightening borrowers' default risk. The pandemic has significantly altered the global economy and financial sector landscape, leading to bankruptcy for many borrowers, especially corporations and small to medium-sized enterprises, hindering their ability to meet banks' obligations.

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Furthermore, the persistent issues of asymmetric information between lenders and borrowers have created a situation in which banks may inaccurately assess their customers' loan repayment abilities. Consequently, borrowers have an increased likelihood of default risk [10, 11]. To mitigate this impact, commercial banks can employ stewardship debtholder tools to curtail the incidence of bad debts and safeguard themselves from bankruptcy risk during the pandemic.

In Vietnam, this study aims to estimate the factors influencing corporations' ability to repay debts at commercial banks in Ho Chi Minh City. To achieve this goal, the research question that needs to be answered is: 'What is the extent of the impact of these factors on the ability to repay corporate debts from 2018 to 2022 at commercial banks in Ho Chi Minh City, Vietnam?

2- Literature Review and Hypothesis Development

2-1- Literature Review

Besides financing from capital, debts are a priority financial source for company generation [12]. Debtholders have traditionally invested, lent, and monitored borrowers based on careful firm-specific analyses of financial health; therefore, debtholders play a decisive role in corporate governance [13]. According to debtholder stewardship theory, [13] explains that the efficiency of modern capital markets is reflected in the role of corporate debtholders, who supervise and constrain borrowers to fulfill their repayment duties.

Debtholders determine a borrower's repayment ability using payment schedules and periodic interest payments based on the loan term [14]. According to Yunus & Jolis [15], borrowers' repayment capability can be determined through the following key characteristics: characteristics, capability, and capital. The ability to repay debts is evaluated through the ratio of the total monthly net income of customers divided by the total monthly expenditure [16]. Furthermore, Kiros [17] demonstrates that the ability to repay loans depends on the characteristics of lenders, borrowers, and the loan itself. The marginal impact of each of these characteristics can influence overdue debt or non-performing loans. Furthermore, Christinal [18] points out that debt holders evaluate a borrower's creditworthiness through the Debt Service Coverage Ratio because it is used to assess the ability of borrowers to meet their debt obligations. The ratio is commonly used to detect a firm's ability to repay its debt due to financial difficulties [19].

In Vietnam, credit institutions classify debt into five groups, as regulated by Circular 02/2013/TT-NHNN. From 2005 to 2015, the State Bank of Vietnam (SBV) made four amendments regarding debt classification, provisioning, and use of reserves to handle credit risks in the banking operations of credit institutions (Table 1). The latest updated document is Circular 22/VBHNNHNN, dated June 4, 2014, with the most recent modification of debt classification summarized as follows [20, 21].

Table 1. Classify customers' ability to repay debts

Ability to repay debts	Duration	Debt classification
Able to repay debt	- No overdue debt - Debt overdue ≤ 90 days	Group 1-2
Inability to repay debt	- Debt overdue > 90 days - Debt extension	Group 3-5

The method used to determine a customer's repayment ability is usually based on the bank's specific criteria, such as the customer's characteristics and characteristics of debt. The assessment of a customer's repayment ability continually changes throughout the credit relationship; therefore, the models measuring repayment capability forecast outcomes in the short term (within one year) [3]. Thus, the repayment capacity of a business refers to the assessment of whether the customer can fulfill its obligation to repay the credit provider throughout the entire duration of the credit relationship or within a specified period, meeting the repayment obligations as agreed upon or not [5].

2-2- Empirical Studies

Nawai & Shariff [22] investigated the influential elements impacting repayment efficacy within microfinance initiatives in Malaysia. Their findings show that gender, formal religious education, distance to the lender office, business formality, total sales per month, total loan received, loan monitoring, and loan disbursement lag have significantly affected borrowers' repayment performance. Pederzoli & Torricelli [23] determined credit scores for borrowing businesses based on the research findings of Edward I. Altman (1968). The authors assumed that an enterprise's financial risk directly influences customers' credit risk. The results indicate four independent variables that best predict the likelihood of business default: long-term debt/total assets, pre-tax profit/total assets, debt/total assets, and revenue/total assets.

Abid et al. [24] develop a credit default prediction model using a logistic regression model and a Discriminant Analysis (DA) model to distinguish between individuals with good and bad credit ratings. When comparing the two models, the logistic regression model demonstrated better predictive capabilities than the Discriminant Analysis model in forecasting customers' credit default likelihood. Nguyen [5] used data from corporate customers at the Military Commercial Joint Stock Bank. The results indicated that the following factors impact repayment ability: operational experience in the current field, outstanding debts, net revenue/total assets, Return on Equity (ROE), loan interest rates, and loan duration. Doan [20] identified factors affecting the repayment ability of corporate customers at the Joint Stock Commercial Bank for Foreign Trade of Vietnam, Ho Chi Minh City Branch. The quantitative results showed that variables such as owners' equity/total assets, enterprise scale, types of enterprises, and working capital/total assets positively influence the repayment ability of corporate customers. Conversely, the loan duration variable has an inverse impact on corporate customers' repayment ability.

Based on relevant studies, the authors have identified the factors influencing corporations' ability to repay debts at commercial banks in Vietnam, which include income, collaterals, loan term, firm size, interest rate, leverage, and net sales. In addition to these factors, since late 2019, the emergence of the COVID-19 pandemic has affected the business activities of customer entities and the entire economy. Therefore, this study also investigated the impact of the COVID-19 factor on corporations' ability to repay debts.

2-3- Hypothesis Development

2-3-1- Income

Based on the literature review of the Debt Service Coverage ratio, income is chosen as a factor affecting a firm's ability to repay debts because it is calculated based on operating income [25]. Income is considered a significant factor affecting the prepayment ability of borrowers because it is a basis metric for banks to calculate and adjust the amount of lending to debtors. It also measures a company's capacity to meet debt obligations generated from operating activities, which is consistent with [26]. They use a cash-based fund flow model to demonstrate that the higher the positive income, the higher the ability to repay loans [27–29]. Gerardi et al. [30] support the argument that borrowers with higher incomes are more likely to prepay all debts to lenders. Based on this argument, the following hypothesis is proposed:

Hypothesis 1: Income has a positive effect on the ability to repay debts of corporations.

2-3-2- Collaterals

Collateral is a prevalent tool within debt agreements, often involving tangible assets or equity that a lender can liquidate if the borrower fails to meet obligations [2]. As a result of information asymmetry, commercial banks limit their loans to customers, depending on collateral [31]. Consequently, collateral utilization is anticipated to increase in scenarios with a more significant pre-existing disparity in information between the borrower and lender [32].

A secured loan with collateral reflects a borrower's commitment to debt repayment responsibilities. Mensah et al. [33] argue that unsecured loans are more likely to default than secured loans are. In the absence of collateral, lenders may resort to raising interest rates or limiting the availability of credit to enhance the probability of borrowers repaying their loans [2]. Increasing bank requirements for collateral assets when granting loans reduces adverse selection issues, leading to a lower default rate [34]. In other words, there is a positive association between collateral and loan repayments [2, 4]. Based on these arguments, the hypothesis is proposed as follows:

Hypothesis 2: collaterals have a positive effect on the ability to repay debts of corporations.

2-3-3- Loan Term

The loan term is the period calculated from the day following the disbursement of the loan capital to the customer by the credit institution until the customer is obligated to fully repay the principal and interest of the loan according to the agreement between the credit institution and customer [8]. Depending on the type of loan product, loan purpose, and the commercial bank's ability to meet capital resources, banks will consider the loan period for borrowers. According to [35, 36], loan terms affect customers' ability to repay debt. When borrowers plan a schedule to repay debt in the long term and with certainty about their income from their projects, the ability to repay debts increases, and vice versa [37]. Based on these arguments, the following hypothesis is proposed.

Hypothesis 3: Loan term has a positive effect on the ability to repay debts of corporations.

2-3-4- Firm Size

Firm size involves categorizing firms into large, medium-sized, and small enterprises. Selecting the size when establishing a business depends on various factors such as total assets, capital, financial capacity, number of employees,

and other aspects of the enterprises [38]. According to Lumapow [39], larger-sized firms tend to exhibit enhanced stability in cash flow, reduced risk of bankruptcy, and enjoy greater accessibility to credit. Consequently, their capacity to repay debts improves because they rely on acquired resources to meet their obligations. Studies by Doan [3] and Nguyen [5] also confirm that firm size is positively correlated with the ability to repay debts.

Hypothesis 4: firm size has a positive effect on the ability to repay debts of corporations.

2-3-5- Interest Rate

The cost of loans, represented by bank lending interest rates, is another variable that influences demand for credit. Mubanga [40] defined interest rate as the price paid for borrowing funds, expressed as a percentage per year. Based on the studies by Stiglitz & Weiss [34] and Stiglitz [41], high interest rates encourage the adverse selection of loan-seekers. Those who take high risk and get their loans approved are those with high default rates, and vice versa. They affirm that there is a negative relationship between the ability to repay debts and interest rates. The interest rate directly affects a borrower's ability to repay a loan. When interest rates are low, borrowers are more inclined to borrow because they perceive it is easier to manage their debt, as suggested by Yibrie & Ramakrishna [9] and Thordsen & Nathan [42].

Hypothesis 5: interest rate has a negative effect on the ability to repay debts of corporations.

2-3-6- Leverage

Myers [43] defined *leverage* as a determinant of a firm's capital structure, encompassing debt and equity financing. Optimizing this composition is crucial for organizational management. Debt represents obligations to others and mitigates owners' risk [44]. However, a high proportion of debt compared with equity heightens credit risk, necessitating prudent debt management by companies to avert default risk. According to Setiawan [6] and Pederzoli & Torricelli [23], there is a relationship between companies' leverage and their ability to repay their responsibility to the bank.

Hypothesis 6: leverage has a negative effect on the ability to repay debts of corporations.

2-3-7- Net Sales

The company's net sales are the sales revenue obtained by selling products to unrelated customers. In addition, it is an important indicator of the performance and marketing ability of a product [8]. In the studies by [5, 8, 20, 23], there is a positive correlation between net sales and corporations' ability to repay their debts.

Hypothesis 7: net sales have a positive effect on the ability to repay debts of corporations.

2-3-8- COVID-19

COVID-19 adversely affects financial markets and causes credit markets to fall into financial distress. The continuous economic decline triggered by the COVID-19 pandemic elevates the chances of the marketplace lending sector experiencing unsustainable losses [45]. These losses are anticipated to grow significantly during a significant economic downturn, potentially depleting investor resources rapidly [46]. The default risk induced by the pandemic was more pronounced from May to June 2020, as indicated by consistently significant and positive coefficients related to the COVID-19 pandemic risk [45]. In contrast, the COVID-19 pandemic has negatively affected customers' ability to repay debts [7].

Hypothesis 8: COVID-19 has a negative effect on the ability to repay debts of corporations.

3- Research Model and Methodology

3-1- Sample Size

Research data were collected from corporate loans from several branches of commercial banks in Ho Chi Minh City. The total questionnaires collected are 400 from commercial banks. The number of observations remaining after filtering was 388.

3-2- Research Model

The details of all factors in Figure 1 are described in Table 2.

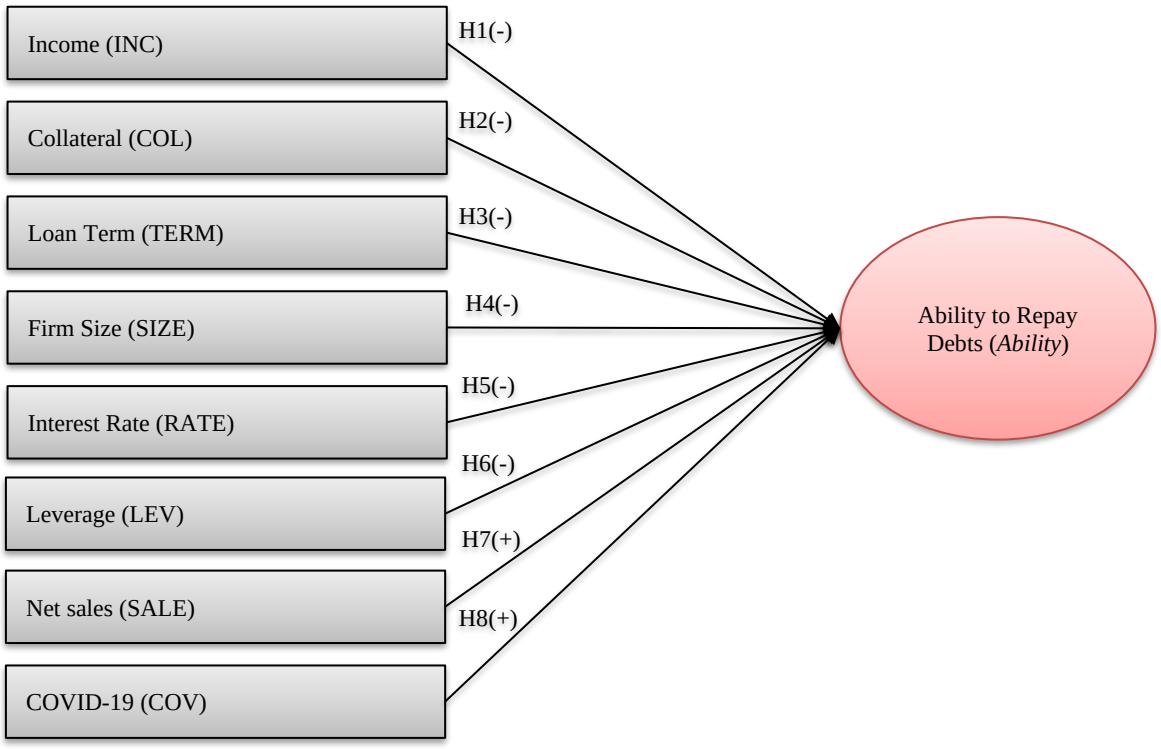

Figure 1. Research model

Table 2. Summary of factors in the model

No.	Factors	Index	Explanation	Expected sign
Dependent Factor				
1	Ability to Repay Debts	AB	ABILITY = 0 if customers have ability to repay debts; otherwise, its value is 1.	
Independent Factors				
1	Income	INC	Ln (Monthly income)	+
2	Collateral	COL	COL = 1 if customers have collateral; otherwise, its value is 0.	+
3	Loan Term	TERM	TERM = 0 if the loan is short term; otherwise, TERM = 1	+
4	Firm Size	SIZE	LN (Total Assets)	+
5	Interest Rate	RATE	LN (Loan Rate)	-
6	Leverage	LEV	LN (Total Liabilities/Total Assets)	-
7	Net Sales	SALE	LN (Sales – Sale Returns & Allowance – Sale Discounts)	+
8	COVID-19	COV	COV = 1 if the year has COVID-19; otherwise, its value is 0.	-

3-3- Research Process and Methodology

The research process shown in Figure 2 includes the necessary steps to determine the factors affecting corporations' ability to repay debts in Vietnamese commercial banks. Starting with the research objective, the author analyzes the literature review and empirical studies to build a research model that shows the determinants of corporations' ability to repay debts. The Binary Logistic regression method was then applied to obtain the findings. Furthermore, we consider whether the predicted model can be applied to forecast the ability of corporations in Vietnamese commercial banks to repay their debts.

To measure the probability of credit default of private customers at state-owned commercial banks in Ho Chi Minh City, the logit model was performed using SPSS 20 (SPSS Statistics version 20). The logistic regression equation of the model with eight independent factors was as follows:

$$log_e\left[\frac{P(AB=1)}{P(AB=0)}\right] = C + \beta_1 \times INC_i + \beta_2 \times COL_i + \beta_3 \times TERM_i + \beta_4 \times SIZE_i + \beta_5 \times RATE_i + \beta_6 \times LEV_i + \beta_7 \times SALE_i + \beta_8 \times COV_i \quad (1)$$

where P(AB) is the probability of ability to repay debts of corporations and β_i is regression coefficients.

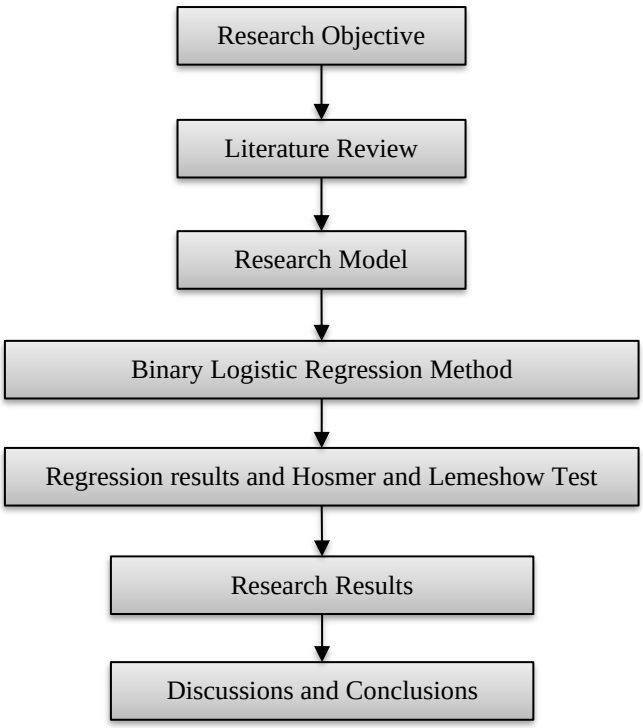

Figure 2. Research process

4- Results and Discussions

4-1- Results

All VIF values are less than 10, which satisfies the condition proposed in Barbur et al. [47]. Thus, multicollinearity was not present in the model. Table 3 shows the Sig. The values of all three indexes in step 1 (Step 1) are less than 5% (with 95% confidence), so the regression model is statistically significant.

Table 3. Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	80.488	11	0.000
	Block	80.488	11	0.000
	Model	80.488	11	0.000

Table 4 shows the model's coefficient of explanation (R^2 = 0.679). This means that 67.9% of the variation in the dependent factor is explained by independent factors, while the rest is due to other factors.

Table 4. Model summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	215.079 [a]	0.493	0.679

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than 0.001.

The following classification is shown in Table 5, which shows the probability of corporate customers' ability to repay debts at joint-stock commercial banks in Ho Chi Minh City according to two criteria: corporations do not have the ability to repay, and Corporations have the ability to repay.

The results in Table 5 show that, in 116 cases of observing corporations that do not have the ability to repay, there are 40 cases of corporations that do not have the ability to repay, with a correct prediction rate of 34.5%. At the same time, in 271 cases of observing corporations with the ability to repay, it is predicted that 257 cases of corporations have the ability to repay debts, with a correct prediction rate of 94.8%. Therefore, the average correct prediction rate was 76.7%.

Table 5. Classification Table [a]

		Observed	Predicted		
			ABILITY		Percentage Correct
			Corporations do not have ability to repay	Corporations have ability to repay	
Step 1	Ability	Corporations do not have ability to repay	40	76	34.5
		Corporations have ability to repay	14	257	94.8
		Overall Percentage			76.7

a. The cut value is 0.500.

Table 6 shows six factors that affect the ability to repay the debts of corporations at commercial banks in Ho Chi Minh, such as income, collateral, firm size, leverage, net sales, and COVID-19. However, to indicate a good-fitting model for forecasting, the Hosmer and Lemeshow tests are implemented. The test has a p-value (0.575) greater than 0.05 since it fails to reject the null hypothesis, implying that the model's estimates fit the data to an acceptable level. Therefore, the model to measure the ability of commercial banks in Ho Chi Minh City to repay debts is as follows:

$$log_e\left[\frac{P(Y=1)}{P(Y=0)}\right] = 4.383 + 1.283 \times Income + 1.043 \times Collateral + 0.981 \times Firm\ size - 0.583 \times Leverage + 0.911 \times Net\ sales + 1.708 \times COVID\text{-}19 \quad (2)$$

Table 6. Regression results

		B	Sig.	Exp(B)
Step 1	Income	1.283	0.013	1.806
	Collateral	1.043	0.005	2.043
	Loan term	0.879	0.065	1.017
	Firm size	0.981	0.006	0.951
	Interest rate	-0.674	0.114	0.841
	Leverage	-0.583	0.048	1.791
	Net sales	0.911	0.012	1.235
	COVID-19	-1.715	0.011	0.544
	Constant	4.383	0.117	80.047

4-2- Discussions

The findings show that the model has six factors that statistically significantly affect corporations' ability to repay debts: income, collaterals, firm size, leverage, net sales, and COVID-19. The subsequent section delves into a detailed discussion regarding each of these factors.

First, the *income* factor has a positive regression coefficient (1.283); therefore, it has a direct effect on the ability of corporations to repay their commercial banks in Vietnam. The results from the Binary Logistic regression model show that when the factor increases by one unit, provided that the influence of the remaining factors in the model remains unchanged, the log of the ability of corporations to repay debts will rise by 1.283 units. Alternatively, the probability of the ability to repay debts increases by 1.806 times compared to the probability of the inability to repay the debts of customers at those banks. These findings are consistent with those of previous studies by Acharya et al. [27] and Casey & Bartczak [28].

Second, the *Collaterals* factor has a positive regression coefficient (1.043); therefore, it has a direct effect on the ability of corporations to repay their commercial banks in Vietnam. Results from the Binary Logistic regression model show that when the factor increases by one unit, provided that the influence of the remaining factors in the model remains unchanged, the log of corporations' ability to repay debts will rise by 1.043 units. Alternatively, the probability of the ability to repay debts increases 2.043 times compared to the probability of an inability to repay the debts of customers at those banks. These findings are consistent with those of previous studies [2, 4, 48].

Third, the *Firm size* factor has a positive regression coefficient (0.981); therefore, it has a direct effect on the ability of corporations to repay their commercial banks in Vietnam. Results from the Binary Logistic regression model show that when the factor increases by one unit, provided that the influence of the remaining factors in the model remains unchanged, the log of corporations' ability to repay debts will rise by 0.981 units. Alternatively, the probability of the ability to repay debts increases by 0.951 times compared with the probability of an inability to repay the debts of customers at those banks. These findings are consistent with the studies by Doan [3] and Nguyen [5].

Fourth, the *Leverage* factor has a negative regression coefficient (-0.583), so it has an inverse effect on corporations' ability to repay their commercial banks in Vietnam. Results from the Binary Logistic regression model show that when the factor increases by one unit, provided that the influence of the remaining factors in the model remains unchanged, the log of corporations' ability to repay debts will decline by 0.583 units. Alternatively, the probability of the ability to repay debts increases 1.791 times compared to the probability of the inability to repay the debts of customers at those banks. These findings are consistent with those of previous studies by Setiawan [6] and Pederzoli & Torricelli [23].

Fifth, the *Net sales* factor has a positive regression coefficient (0.911), so it has a direct effect on corporations' ability to repay their commercial banks in Vietnam. Results from the Binary Logistic regression model show that when the factor increases by one unit, provided that the influence of the remaining factors in the model remains unchanged, the log of the ability of corporations to repay debts increases by 0.911 units. Alternatively, the probability of the ability to repay debts increases by 1.235 times compared with the probability of an inability to repay the debts of customers at those banks. These findings were consistent with those of previous studies [5, 8, 20, 23].

Finally, *COVID-19* has a negative coefficient (-1.715), so the COVID-19 factor negatively impacts corporations' ability to repay debts at commercial banks in Vietnam. Results from the Binary Logistic regression model show that when the COVID-19 factor increases by one unit, provided that the influence of the remaining factors in the model remains unchanged, the log of the default probability ratio of private customers decreases by 1.715 units. Alternatively, the probability of the ability to repay debts increases 0.544 times compared to the probability of an inability to repay the debts of customers at those banks. These findings are consistent with those of studies by Tiwari et al. [7] and Nigmonov & Shams [45].

5- Conclusion

This study aims to estimate the effect of these factors on corporations' ability to repay their debts at commercial banks in Vietnam, especially in Ho Chi Minh City. The binary logistic model was used to identify six factors that statistically affect the ability to repay debts: income, collaterals, firm size, leverage, net sales, and COVID-19. In addition, the author conducted the Hosmer and Lemeshow tests to indicate that the model's estimates fit the data to an acceptable level. This means that the test results show no difference between the actual and predicted values, and thus, the model can be used for forecasting. The contribution of this paper is highlighted in the effect of COVID-19 on the ability to repay the debts of corporations in Ho Chi Minh City, Vietnam.

While the study has yielded specific outcomes, it remains constrained by several limitations. First, the study's sample size is relatively small, implying that the research findings may not provide a comprehensive perspective on commercial banks. Second, the factors contributing to defaults are examined solely from the customer's perspective. Consequently, future research endeavors should expand the model to encompass factors related to commercial banks, warranting more comprehensive and in-depth analysis.

6- Declarations

6-1- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

6-2- Funding

The author received no financial support for the research, authorship, and/or publication of this article.

6-3- Acknowledgements

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6-4- Institutional Review Board Statement

Not applicable.

6-5- Informed Consent Statement

Not applicable.

6-6- Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the author.

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