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Determinants of Bank Lending to Microenterprises: Evidence from Vietnam's Commercial Banks

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Abstract: *Microenterprises largely rely on bank loans for external funding. In an emerging market such as Vietnam, the role of commercial banks in providing loans to micro-firms is even more crucial. The present paper examines the question of what the determinants of bank lending to microenterprises are. This study conducts a two-step system generalised method of moments (GMM) estimation to investigate the relationship between bank-specific variables, macroeconomic factors, and bank industry characteristics on bank loans to microenterprises using the panel data from 26 Vietnamese commercial banks from 2011 to 2020. The results show that the microenterprise loan growth rate depends on bank-specific variables and macroeconomic factors. However, bank-specific variables and banking industry characteristics determine microenterprise lending propensity. This paper also contributes to the debate concerning microenterprise lending as the best approach, and which type of commercial banks would most often choose this alternative. Interestingly, it was demonstrated that larger banks had higher microenterprise loan growth rates, and smaller banks experienced a greater proportion of microenterprise loans in their total business loans.*

Keywords: Microenterprise loans; Lending behaviour; Lending propensity; Bank size; Risk-taking behaviour
JEL Classification: G21, G32, E51

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1. Introduction

In most economies, microenterprises account for the largest proportion of businesses. In 2020, there were 5.7 million microenterprises, accounting for 96% of all businesses in the United Kingdom (Hutton, 2021). The corresponding statistics for India in 2019 were 63 million and 99.4%, respectively (Soni, 2020). Microenterprises are crucial for creating jobs, increasing the supply of goods and services, promoting competitiveness, and reducing poverty, particularly in developing countries. However, one of the main obstacles preventing micro-business growth has been their lack of access to finance (Khandker et al., 2013; McKenzie & Woodruff, 2008).

At the same time, in applying asymmetric information theory (Akerlof, 1978), many studies explain that information on small and micro enterprises (SMEs) is harder to obtain compared to larger firms. Therefore, the problems of adverse selection and moral hazard will more likely occur for SMEs, making it extremely difficult to issue securities to raise external funding. Such firms largely depend on bank credit rather than other sources of financing, especially in developing countries where banks dominate all sectors of the financial markets. Many policymakers have emphasised the need to increase bank lending to microenterprises. This situation has increased interest in the determining factors of bank lending to microenterprises in emerging countries. Understanding bank lending behaviour is crucial for policymakers to stimulate bank loans to micro-firms, and is also relevant to the managers of banks and firms.

The present study utilises a panel data set comprising data from commercial banks in Vietnam to address the abovementioned question. Vietnam is selected to highlight microenterprise lending activities in an emerging country context, and offers an interesting research setting with a dynamic transitional economy, rapid growth, and macroeconomic stability. Microenterprises which account for more than 70% of all businesses have made an important contribution to the reform of the Vietnamese economy. However, from 2016 to 2018, such firms only attracted about 8.9% of external funds (Ministry of Planning and Investment, 2020). Commercial banks remain the main loan providers in emerging economies like Vietnam. Thus, the banking system has been a critical driver of economic growth. It has also played a key role in financing microenterprises.

This study contributes to the literature from several perspectives. First, it examines the determinants of bank lending to microenterprises. Second, it adds to the debate on which type of commercial banks are more likely to provide loans to microenterprises. For example, the question of whether large or small banks, or banks with high or low levels of profitability might better facilitate microenterprise lending remains open. Finally, this study is valuable owing to its analysis of the research topic in an emerging market context. Despite numerous studies conducted in developed countries examining the relationship between bank characteristics, macroeconomic variables and bank financing to microenterprises, there are only a handful of studies that focus on the context of emerging markets, where small and micro businesses rely on commercial bank lending rather than other sources of external funding.

The paper is structured as follows. The literature review is contained in Section 2, followed by a clarification of the research methodology in Section 3. The research findings are presented in Section 4, along with a discussion concerning related issues. Section 5 concludes the paper.

2. Literature Review

2.1. Theoretical background

2.1.1 Asymmetric information theory

Asymmetric information theory has been widely used to explain credit-related problems for SMEs. Asymmetric information occurs when borrowers have more information than lenders. This problem has been more severe in the case of microenterprises because of the significant lack of information available about them. Without enough information, a bank (the lender) cannot precisely evaluate a microenterprise (the borrower), making it difficult to predict the firm's future profitability. Banks face several difficulties when lending to microenterprises as a result of this information asymmetry: high cost of obtaining credit information, inconsistent financial information, and a lack of access to third-party information (Malhotra, 2007).

2.1.2 Credit rationing theory

According to the credit rationing theory, a bank may refuse to provide credit to a borrower even when the latter agrees to pay the interest rate demanded by the bank. Even if the borrower accepts paying a higher interest rate than is required, the bank may refuse to lend. Stiglitz and Weiss (1981) point out two cases of credit rationing. First, among seemingly identical borrowers, some received loans, while others did not. Even if the borrowers offered to pay a higher interest rate, they were still refused loans by commercial banks. Second, at a specified level of credit supply, a group of customers could not receive loans at any interest rate.

The credit rationing theory can be applied to explain the factors affecting bank lending to microenterprises. According to Jin and Zhang (2019), banks often find it costly to provide loans to microenterprises. As loan sizes for microenterprises are typically small, the administration cost of such loans increases. Microenterprises lack tangible assets as collateral and are exposed to greater information asymmetry problems than other bank customers. This situation leads to microenterprise loans becoming less profitable. Therefore, commercial banks are likely to restrict such loans when allocating credit to maximise profits.

2.2. Determinants of bank lending to microenterprises

Recent literature has distinguished three factors determining bank lending to microenterprises: bank industry characteristics, as well as bank-specific and macroeconomic variables. One of the underlying reasons for banks' lending decisions relates to bank size. Many studies have investigated the extent to which banks of different sizes lend to SMEs, with contradictory results. Many support the argument that small banks are more likely to support small firms than large banks (Berger et al., 1998; McNulty et al., 2013; Carter et al., 2004; Nakamura, 1994; Petersen & Rajan, 1995). According to Berger et al. (1998), small banks have a comparative advantage in lending to small and opaque businesses using lending technology mainly based on 'soft' information. In contrast, large banks specialise in lending to larger firms and utilise 'hard' information-based lending technologies.

Carter et al. (2004) explain that small banks might have an information advantage in credit assessment. In addition, the findings of Nakamura

(1994) imply that small banks provide loans to local small businesses more readily because they can monitor those businesses closely, and their tight organisational structures allowed them to make effective use of the information acquired. Petersen and Rajan (1995) use asymmetric information theory to explain the importance of building relationships between banks and their borrowers. These relationships increase credit availability, especially for new businesses with asymmetric information issues. A recent study by Mkhaiber and Werner (2021) utilising a large sample also provides strong evidence to support the inverse relationship between bank size and the propensity to lend to SMEs.

However, some studies show a positive impact of bank size on lending propensity to small businesses. Berger and Black (2011) argue that small commercial banks have a comparative advantage through relationship lending. However, this advantage is best promoted when lending to larger rather than smaller businesses. Ongena and Şendeniz-Yüncü (2011) indicate that small firms are often more interested in obtaining loans from larger banks. The authors explain that credit officers at large banks often have a greater role in lending decisions than in smaller banks. Therefore, relationships developed between small businesses and the credit officers at these large banks helping them to obtain loans more easily than with small banks. Other bank-specific variables affecting bank lending include credit risk (Mkhaiber & Werner, 2021; Peek & Rosengren, 1998), bank profitability (Carter & McNulty, 2005; Mkhaiber & Werner, 2021; Peek & Rosengren, 1998), bank liquidity (Abdul Karim et al., 2011; Aisen & Franken, 2010), bank deposits (McNulty et al., 2013; Tran, 2020), and bank risk aversion behaviour (Bouvatier & Lepetit, 2008; Mkhaiber & Werner, 2021).

Macroeconomic factors can also determine bank lending to microenterprises. Some researchers have shown that gross domestic product (GDP), interest, and inflation rates are underlying reasons for lending decisions. However, how these factors affect lending to microenterprises has been contested. According to Vo (2018), there is a relationship between growth and lending activities of commercial banks. Business cycles have a major influence on the availability of credit. Credit supply tends to gradually decrease during periods of very tight monetary policy. In short, banks themselves have less financial resources when financial resources are in shorter supply (Barajas & Stein, 2002). Monetary policy not only affects short-term interest rates, but also causes changes in bank reserves and

deposits, thereby affecting the availability and cost of credit. Banks tend to reduce their credit supply during periods of macroeconomic instability due to greater risk. In countries subject to prolonged periods of instability or highly vulnerable to economic shocks, credit to the business sector tends to be more limited and interest rates tend to be higher.

Since microenterprises are greatly affected by changes in the economy, bank lending to microenterprises might expand when the economy grows and vice versa. Some studies have shown that inflation negatively impacts lending activities. This means that an increase in inflation may result in less loans provided by commercial banks. The inverse relationship between inflation and lending rates can explain this. An increase in the inflation rate can lead to a decrease in the real lending rate, negatively affecting loan profitability and the supply of bank loans (Vo, 2018). In contrast, Stepanyan and Guo (2011) show a positive impact of the inflation rate on the nominal amount of bank loans. They explain that banks might increase the amount of loans to offset the negative impacts of decreasing real lending rate on bank profits.

Similarly, two contractionary arguments have been proposed concerning the impact of interest rates on bank lending. According to McKinnon (2009), lower real interest rates create greater incentives for banks to provide more loans, as they increase their lending amounts to offset the reduction in interest income. However, this study only considers lending activities and not loan characteristics. Loans to microenterprises are characterised by high risks, high loan management costs, and small loan values. Therefore, higher interest rates may motivate banks to expand micro-business lending.

Bank industry concentration may also affect lending to SMEs. There have been two opposing views on the influence of banking market competition on SME lending: the information and market power hypotheses. The information hypothesis is supported by Petersen and Rajan (1995), who argue that banks with a greater market share earn high enough profits from high-quality borrowers to offset losses from small firms, which might suffer from severe asymmetric information problems. As a result, banks with market power can lend to SMEs more than commercial banks with more competition. In contrast, Cetorelli and Strahan (2006) support the market power hypothesis and argue that the less competitive the credit market, the lower the incentives for commercial banks to finance startups or small firms.

3. Research methodology

3.1. Data

Data concerning microenterprises from 2011 to 2020 was extracted from the Enterprise Survey of Vietnam's General Statistics Office. In the present study, businesses are considered microenterprises if the registered companies met the government's criteria specified in Decree No. 39/2018/ND-CP. To create a sample of microenterprises from the Enterprise Survey, the study classified all firms into three groups based on their sectors: agriculture, forestry, and fishing; industry and construction sector; and trade and service. For the first two groups, businesses that met the following criteria simultaneously were filtered out: the average number of employees participating in social insurance of no more than 10 people per year, and total annual revenue of not more than VND3 billion. For the trade and service sector, businesses that met the following criteria simultaneously were filtered out: the average number of employees participating in social insurance of no more than 10 people per year, and total annual revenue of not more than VND10 billion. Since the Enterprise Survey data does not provide information on business capital, this indicator was not used to classify businesses by size.

The Vietnam Credit Information Center (CIC) provided secondary data on bank loans to microenterprises. The data on banks' characteristics was obtained from Bankscope. According to the State Bank of Vietnam (2021), there are 35 commercial banks in Vietnam. Banks not meeting the information criteria required for calculating specific variables were excluded. Moreover, three banks taken over by the State Bank of Vietnam because of their poor performance were also excluded from the data set. Macroeconomic data was also collected from the World Bank's World Development Indicators (WDI).

The final sample comprised a balanced dataset including 26 Vietnamese commercial banks from 2011 to 2020. Panel data is a combination of observations regarding different cross-sections across time, which can provide greater information, variability, and efficiency, as well as increase the possible number of observations (Hsiao, 2007). The period of 2011 to 2020 was chosen as the research period since there were no unusual events that severely affected the lending behaviour of commercial banks in Vietnam

during that period. The Covid-19 pandemic and prevention measures did not significantly affect Vietnam's economy until 2021.

3.2. Research model and variables

The present study employs a widely used dynamic panel model focusing on bank lending behaviour and lending to small firms to investigate the determinants of bank lending behaviour to microenterprises (McNulty et al., 2013; Mkhaiber & Werner, 2021; Vo, 2018). The empirical specification is as follows:

$$Y_{it} = \beta_0 + X_{it} + Y_t + Z_t + \varepsilon_{it}$$

where, $Y_{i,t}$ is the dependent variable, measuring lending to microenterprises of bank i in time t, $X_{i,t}$ the bank-specific variables of bank i in time t, Y_t the macroeconomic variables in time t, Z_t the control variables, B_0 the intercept, and ε_{it} the error term.

The present study uses two proxies to measure bank lending to microenterprises: rate of microenterprise loan growth (MLG) and propensity of bank lending to microenterprises (MLP). The lending growth rate is an important measure of bank lending behaviour. Many studies have used this proxy when focusing on bank lending behaviour (Nguyen & Dang, 2020; Vo, 2018). A higher rate of microenterprises loan growth implies that banks have expanded bank loans to microenterprises over time. Lending propensity, meanwhile, is important when evaluating banks' willingness to lend to small firms. Many researchers have used lending propensity to investigate bank loans to small and micro firms (Berger et al., 2007; Berger & Udell, 2006; McNulty et al., 2013; Mkhaiber & Werner, 2021; Shen et al., 2009). However, the means by which this propensity is measured has been contested. Different authors (Berger et al., 1998; Berger & Udell, 2006; Peek & Rosengren, 1998) define the propensity of commercial banks to lend to small firms as the ratio of small business loans to total assets. However, Berger et al. (2007) claim this ratio might be lower at larger banks, since they can expand their assets by granting loans to large firms or other investments. Lower ratios in larger banks may come from greater denominators rather than smaller numerators.

As a result, some researchers have used the ratio of small business loans to total loans as an alternative (McNulty et al., 2013; Shen et al., 2009). However, Mkhaiber and Werner (2021) suggest that using this ratio to define the propensity of commercial banks to lend to small firms may not be sufficient. They argue that some banks might specialise in non-business loans. As a result, their lower ratio of small business loans to total loans may erroneously imply that such banks are unwilling to lend to small businesses. The researchers suggest the ratio of small business loans to total business loans as a solution to this problem. The present study adopts the definition of lending propensity used by Mkhaiber and Werner (2021) to address the denominator effect identified by Berger et al. (2007). As such, the propensity of bank lending to microenterprises is calculated as follows:

$$Propensity\ ratio\ of\ bank\ lending\ to\ microenterprises\ = \frac{Microenterprises\ loans}{Business\ loans}$$

Several explanatory variables to control for factors which may have affected the banks' loans to microenterprises are also employed here, including macroeconomic variables (i.e., GDP, inflation, interest rates), bank-specific variables (i.e., bank size, credit risk, bank liquidity, bank profitability, bank aversion, deposit) and control variables (i.e., market concentration). It should also be noted that some common proxies were employed to measure bank liquidity (Nguyen & Phan, 2017). In this study, the loan-to-deposit ratio was used as it more accurately measures bank liquidity, while other proxies, such as the liquid assets-to-total asset ratio, loans-to-total asset ratio, and the liquid assets-to-deposit ratio, typically focus on only one aspect of bank liquidity—either the liquidity of assets or liquidity of liabilities.

Banks' risk aversion is often measured by the capital adequacy ratio (CAR). CAR was first introduced in 1988 with the Basel I Accord, the set of global standards for the prudential regulation of banks established by the Basel Committee on Banking Supervision. Basel II, which was released in 2004, is the second of the three accords. Basel II consists of three pillars: new CAR, supervisory review, and market discipline (Decamps et al., 2004). However, in the present study, banks' risk aversion is measured using another proxy. This is because some Vietnamese commercial banks (e.g., SHB and HDBank), have completed all three pillars of Basel II,

while others have only completed parts of Basel II (e.g., MB and VIB). This situation creates a problem of heterogeneity in the measurement of the CAR. Consequently, the present study could not use CAR to measure bank aversion and instead employed the ratio of bank capital to total assets. This ratio has been used in many studies concerning commercial banks in Vietnam (Vo, 2018; Nguyen & Dang, 2020).

Market concentration was employed as a control variable. Market concentration is measured using the Herfindahl-Hirschman Index (HHI):

$$HHI = \sum_{i=1}^{n} s_i^2$$

where, s_i is the market share of bank i, and n the total number of banks in the market. The definitions of all variables used in this paper are presented in Table 1.

Table 1: Definitions of Variables

Variable	Description	Measure
	Dependent variable	
MLG	Microenterprises lending growth	Bank loans to the microenterprise growth rate
MLP	Microenterprises lending propensity	Microenterprises loans/ business loans
	Independent variables	
SIZE	Bank size	Natural logarithm of total assets
NPL	Credit risk	Non-performing loans/ total loans
LIQ	Bank liquidity	Loans outstanding/ total deposit
ROA	Bank profitability	Net income/ total assets
EQTA	Bank aversion	Equity/ total assets
DEP	Deposit	Deposit/ total assets
GDP	Economic growth rate	Annual real GDP growth rate
INF	Inflation	Annual inflation rate
INR	Interest rate	Annual real interest rate
	Control variable	
HHI	Market concentration	HHI ratio

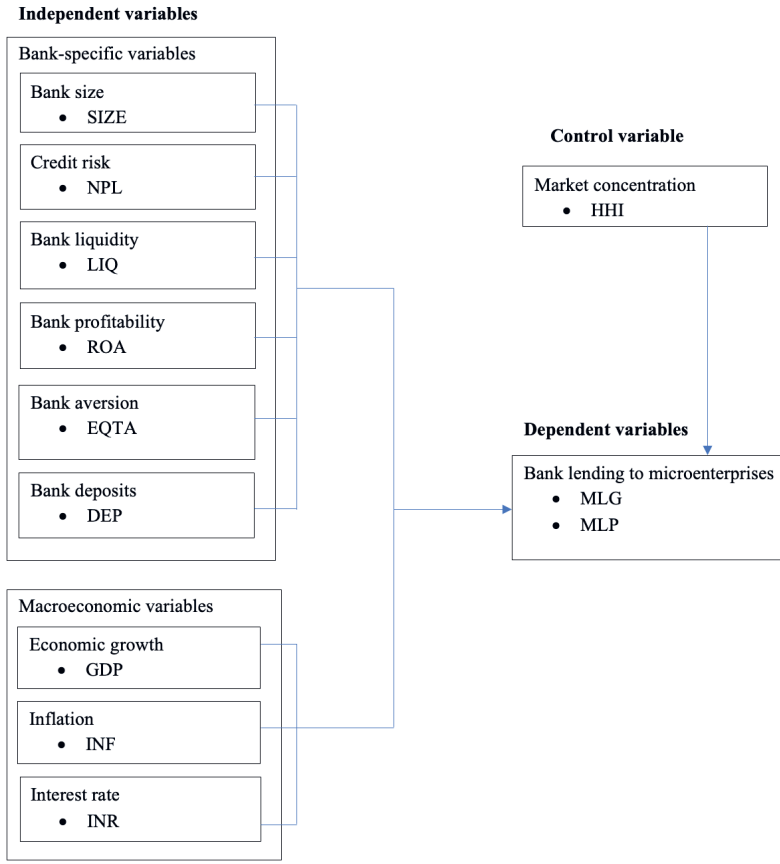
The regression equations are as follows:

$$MLG_{i,t} = b_0 + b_1 SIZE_{i,t} + b_2 NPL_{i,t} + b_3 LIQ_{i,t} + b_4 ROA_{i,t} + b_5 EQTA_{i,t} + b_6 DEP_{i,t} + b_7 GDP_{i,t} + b_8 INF_t + b_9 INR_t + b_{10} HHI_t + \varepsilon_{i,t} \quad (1)$$

$$MLP_{i,t} = c_0 + c_1 SIZE_{i,t} + c_2 NPL_{i,t} + c_3 LIQ_{i,t} + c_4 ROA_{i,t} + c_5 EQTA_{i,t} + c_6 DEP_{i,t} + c_7 GDP_{i,t} + c_8 INF_t + c_9 INR_t + c_{10} HHI_t + \varepsilon_{i,t} \quad (2)$$

The conceptual framework of the study is presented in Figure 1. The independent variables include bank-specific variables and macroeconomic variables. The control variable is market concentration, which is measured by the HHI ratio.

Figure 1: Conceptual Framework



4. Results and discussion

4.1 Descriptive statistics

Table 2 presents the descriptive statistics of the variables employed in the analysis. The table shows that the average MLP was approximately 2.76%, indicating that the outstanding loans for microenterprises account for a very small proportion of total business loans. The lowest value of approximately 0.4% and the highest value of 19.32% indicates the differences in lending propensity to microenterprises among commercial banks in Vietnam. The average value of microenterprise loan growth is 26.24%, with the highest value more than 164%, the lowest value -5.1%, with a high standard deviation of 36.75%. The mean value of the ROA variable is 0.75%, the highest value is 2.63%, and the lowest value is approximately -5.51%. Negative values indicate that banks had suffered losses during difficult economic years or that some banks had particularly poor business performance compared to the industry average.

Table 2: Descriptive Statistics

Variables	Observations	Mean	Std. Dev.	Minimum	Maximum
MLP	260	0.028	0.031	0.004	0.193
MLG	260	0.262	0.368	-0.051	1.650
SIZE*	260	2.76e+08	3.36e+08	1.47e+07	1.57e+09
EQTA	260	0.088	0.039	0.026	0.238
ROA	260	0.007	0.007	-0.055	0.026
NPL	260	0.023	0.015	0.000	0.114
LIQ	260	0.858	0.177	0.372	1.805
DEP	260	0.672	0.125	0.251	0.930
HHI	260	0.083	0.002	0.077	0.085
GDP	260	0.062	0.121	0.029	0.071
INF	260	0.055	0.049	0.006	0.187
INR	260	0.039	0.029	-0.036	0.073

Note: * SIZE in this table is displayed in millions of VND while converted into logarithms when included in the regressions.

The Pearson correlation and variance inflation factor (VIF) were used to check for multicollinearity. Tables 3 and 4 present the matrix of correlation coefficients between the variables employed in the analyses of Models 1 and 2, respectively. These tables show that all the correlation coefficients in both models were less than 0.8. Consequently, the problem of multicollinearity does not exist in the regression estimation.

Table 3: Correlation Matrix of Model 1

Variables	MLG	SIZE	NPL	LIQ	ROA	EQTA	DEP	INF	GDP	INR	HHI
MLG	1										
SIZE	-0.0769	1									
NPL	0.0932	-0.2327	1								
LIQ	-0.0822	0.1767	-0.0689	1							
ROA	0.0370	0.1838	-0.2198	0.3981	1						
EQTA	0.0626	-0.6534	0.2178	0.0545	0.2753	1					
DEP	-0.1277	0.2582	-0.0838	-0.2491	-0.2755	-0.2514	1				
INF	0.0109	-0.1989	0.4509	-0.0506	0.0436	0.2454	-0.2813	1			
GDP	0.1372	-0.0434	-0.0762	-0.0065	-0.1259	-0.0497	0.0155	-0.2839	1		
INR	0.0527	0.0412	-0.2079	-0.1231	-0.1168	-0.0799	0.2052	-0.6786	0.1675	1	
HHI	0.1353	0.0638	-0.2185	0.0736	-0.0799	-0.1222	0.1046	-0.5495	0.7479	0.3617	1

Table 4: Correlation Matrix of Model 2

Variables	MLP	SIZE	NPL	LIQ	ROA	EQTA	DEP	INF	GDP	INR	HHI
MLP	1										
SIZE	-0.1362	1									
NPL	-0.0298	-0.2002	1								
LIQ	0.1204	0.1018	-0.0410	1							
ROA	0.0198	0.1327	-0.1327	0.3458	1						
EQTA	0.0640	-0.6725	0.1945	0.1128	0.2790	1					
DEP	0.2263	0.3062	-0.0732	-0.2858	-0.1303	-0.2440	1				
INF	-0.1407	-0.2269	0.2475	0.1671	0.0954	0.1983	-0.5544	1			
GDP	-0.0229	-0.0517	-0.0667	0.0089	-0.0886	-0.0385	-0.0224	-0.0650	1		
INR	0.1158	0.1586	-0.1526	-0.2321	-0.1218	-0.1304	0.5226	-0.7285	0.0218	1	
HHI	0.1084	0.1576	-0.1884	-0.1086	-0.1069	-0.1563	0.4257	-0.7184	0.4630	0.7548	1

Table 5 reports the VIF values. A multicollinearity problem exists if the VIF values exceed 10 (Wooldridge, 2015). Table 5 shows that all the VIF values in the model were less than 10. Therefore, multicollinearity does not exist in the regression model. It is worth noting that the correlation between INF and INR is quite high but still below 0.8 (see Tables 3 and 4). However, the VIF of independent variables, which measure the strength of the correlation between independent variables in regression analysis (Table 5), show that the problem of multicollinearity in the regression model may not be severe since the VIFs are moderate. Moreover, the study uses real interest rates adjusted for changes in price level as the proxy for variable INR, instead of nominal interest rates which make no allowance for inflation. Consequently, the use of both INF and INR variables is valid and does not create a severe problem of multicollinearity.

Table 5: Variance Inflation Factor

Variable	VIF
HHI	6.56
INF	5.50
INR	4.63
GDP	4.59
DEP	1.73
SIZE	1.53
EQTA	1.50
LIQ	1.33
ROA	1.32
NPL	1.15
Mean VIF	**2.98**

4.2. Estimation technique selection

Initially, statistical tests were employed to determine the most suitable regression method among three proposed methods: pooled ordinary least squares (OLS), fixed effects model (FEM) and random effects model (REM). The Hausman test, which can differentiate between FEM and REM in panel analysis, indicate that FEM was preferred over REM in Models 1 and 2. The F-test was used to determine the best method between pooled OLS and FEM. The results suggest that both are suitable for use with the

FEM. Diagnostic tests were applied to investigate whether basic model assumptions had been violated.

Table 6 shows the results of the Wooldridge test for autocorrelation. Both models' *p*-values indicated autocorrelation (< 5%).

Table 6: Wooldridge Test for Autocorrelation

Wooldridge test for autocorrelation in panel data H0: no first-order autocorrelation		
Model 1	F(1,25)	11.331
	Prob > F	0.0025
Model 2	F(1,25)	6.63
	Prob > F	0.0169

Table 7 shows the results of the modified Wald test for groupwise heteroskedasticity in the fixed effect regression model. Both models' *p*-values showed heteroskedasticity (< 5%).

Table 7: Modified Wald Test

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model H0: sigma(i)^2 = sigma^2 for all i	
Model 1	chi2 (26) = 4970.60
	Prob > chi2 = 0.0000
Model 2	chi2 (26) = 7588.11
	Prob > chi2 = 0.0000

The diagnostic tests imply the existence of heteroskedasticity and autocorrelation in the fixed-effects regression model. The present study used the system generalised method of moments (GMM) estimation method to correct these problems. Using a system GMM estimator can also address the problems of endogeneity, biasedness and inconsistency and obtain robust estimates (Arellano & Bond, 1991). Moreover, the system GMM estimator is designed for situations with 'small T, large N' panels, meaning few periods and many individuals and justifies the problem of a small sample. This situation represents the characteristics of the data set used in this study.

Moreover, the present research chose a two-step system GMM estimator over a one-step system GMM estimator. In the system GMM estimator, one-

step standard errors are asymptotically inefficient and two-step estimators are more powerful in asymptotes. This method uses lagged values of the explanatory variables as instruments. Therefore the regression models are as follows:

$$MLG_{i,t} = \beta_0 + \beta_1 L.MLG_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 NPL_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 ROA_{i,t} + \beta_6 EQTA_{i,t} + \beta_7 DEP_{i,t} + \beta_8 GDP_{i,t} + \beta_9 INF_t + \beta_{10} INR_t + \beta_{11} HHI_t + \varepsilon_{i,t} \quad (1)$$

$$MLP_{i,t} = \chi_0 + \chi_1 L.MLP_{i,t} + \chi_2 SIZE_{i,t} + \chi_3 NPL_{i,t} + \chi_4 LIQ_{i,t} + \chi_5 ROA_{i,t} + \chi_6 EQTA_{i,t} + \chi_7 DEP_{i,t} + \chi_8 GDP_{i,t} + \chi_9 INF_t + \chi_{10} INR_t + \chi_{11} HHI_t + \varepsilon_{i,t} \quad (2)$$

The Hansen test was used for the validity of instrumental variables with the null hypothesis that the instruments are valid. According to Roodman (2009), the instrumental variables in the system GMM model are valid if the *p*-value of the Hansen test is greater than 0.1 and less than 0.25. This study also performed the Arellano-Bond test for autocorrelation. As the first-order serial correlation was expected due to the lagged dependent term and should not have been a problem, this analysis did not use the Arellano-Bond test for AR(1). Instead, the Arellano-Bond AR(2) test was employed with the null hypothesis of no second-order serial correlation.

4.3. Estimation results and discussion

Table 8 reports the estimation results for Model 1. The *p*-value of the Hansen test is 0.139, indicating that the instrumental variable in the system GMM model is valid. The AR(2) test result with a *p*-value of 0.185 (> 0.1) shows no autocorrelation in the model. Therefore, the credibility of the results is verified, and the results can be interpreted with high confidence. The lagged dependent variable was positive and significant in explaining contemporaneous dependent variables. This situation indicates that the microenterprise lending behaviour of Vietnamese banks was highly persistent.

Table 8: Estimation Results for Model 1

Variables	Coefficient	Corrected Std. Err.	Z	P > |z|	[95% conf. interval]	
L.MLG	0.1475**	0.0613	2.41	0.016	0.0274	0.26756
SIZE	0.0747*	0.0451	1.65	0.098	-0.0138	0.16320
NPL	-7.7031*	3.9875	-1.93	0.053	-15.5189	0.1123
LIQ	-0.1080	0.1749	-0.62	0.537	-0.4507	0.2348
ROA	-18.9607	14.9550	-1.27	0.205	-48.2720	10.3506
EQTA	2.1190	1.6207	1.31	0.191	-1.0574	5.2955
DEP	-0.6583***	0.2247	-2.93	0.003	-1.0987	-0.2179
GDP	3.5400*	2.1125	-1.68	0.094	-7.6800	0.6009
INF	3.7894***	0.9176	4.13	0	1.9909	5.5879
INR	1.0889	1.1738	0.93	0.354	-1.2116	3.3894
HHI	-13.5112	8.3592	-1.62	0.106	-29.8950	2.8726
_cons	0.4059	1.2833	0.32	0.752	-2.1093	2.9210
Hansen Test					0.139	
AR(2)					0.185	

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

The SIZE coefficient was positive and statistically significant at the 10% level. This outcome implies that the larger the bank size, the higher the microenterprise loan growth rate. This could explain why large banks have an advantage in using different lending techniques for loans to microenterprises. Many microenterprises in Vietnam have weak or unsystematic accounting practices, or lack updated tax reports and financial statements (Le & Tran, 2004). Consequently, commercial banks might rely on firms' collateral to make lending decisions. However, in some cases, firms even lack tangible assets as collateral (Le, 2014; Dao et al., 2016; Pham, 2017). Commercial banks, therefore, might rely on customer relationship lending techniques. By employing various lending techniques, larger banks can reduce the financial barriers of microenterprises in accessing bank loans and expand microenterprise lending more rapidly than smaller banks. This result supports previous studies by Berger and Black (2011) as well as Ongena and Şendeniz-Yüncü (2011).

The NPL ratio was negatively correlated with the growth rate of outstanding loans for microenterprises at the significance level of 10%, in line with Mkhaiber and Werner (2021) and Peek and Rosengren (1998). This relationship can be explained in the light of credit rationing theory.

Commercial banks with high NPL ratios often narrow down high-risk lending activities. Microenterprises are often considered risky borrowers so commercial banks with high NPL ratios will reduce their credit growth. In Vietnam, the state bank maintains a credit limit policy. Therefore, banks with high NPL ratios often have a lower credit limit than others. Consequently, bad debt may reduce the competitiveness, financial position, and ability to expand the credit of Vietnamese commercial banks. Thus, higher NPLs may result in a lower loan growth rate of Vietnamese commercial banks in general and lower microenterprise lending in particular.

The coefficient of DEP is negative and statistically significant at the 1% level, implying that banks that are less reliant on deposits as sources of funds had higher microenterprise loan growth rates. This situation can be explained by the fact that depositors may more closely monitor banks which are more dependent on deposits. Therefore, such banks are likely to be more cautious and reduce loans to risky borrowers, such as microenterprises. In addition, Vietnamese commercial banks with higher ratios of deposits to total assets are often smaller banks. The reason is that smaller banks in Vietnam depend heavily on deposits as the source of their funds, while larger banks can easily access other sources of funds.

The economic growth rate had a positive significant impact on the microenterprise loan growth rate. One possible reason for this is that businesses are more willing to borrow during a business cycle expansion as they are likely to have many profitable investment opportunities that need financing.

Inflation is negatively correlated with the growth rate of outstanding loans for microenterprises at the significance level of 10%. This implies that low and stable inflation encouraged banks to expand their lending activities, including microenterprise lending. This negative link also suggested that Vietnamese banks should support inflation reduction measures. To reduce the inflation rate, the State Bank of Vietnam may require banks to decrease loans. This situation may lead to decreases in bank credit and the microenterprise loan growth rate.

Table 9 reports the estimation results for Model 2. The *p*-value of the Hansen test is 0.153, indicating that the instrumental variable in the system GMM model is valid. The AR(2) test result with a *p*-value of 0.329 (> 0.1) showed no autocorrelation in the model. Therefore, the credibility of the results is verified, and the results can be interpreted with high confidence.

The estimation results for Model 2 show that the lagged dependent variable is positive and statistically significant at the 1% level. This outcome indicates that the microenterprise lending propensity of Vietnamese banks is also highly persistent.

Table 9: Estimation Results for Model 2

Variables	Coefficient	Corrected Std. Err.	Z	P > |z|	[95% conf. interval]	
L.MLP	0.8329***	0.1613	5.16	0	0.5168	1.1489
SIZE	-0.0213**	0.0114	-1.86	0.063	-0.0436	0.0011
NPL	-0.7618*	0.4523	1.68	0.092	-0.1247	1.6483
LIQ	-0.0125	0.0374	-0.33	0.738	-0.0857	0.0607
ROA	6.5100***	2.5288	2.57	0.01	1.5535	11.4664
EQTA	-0.5060*	0.3022	-1.67	0.094	-1.0984	0.0863
DEP	0.0295	0.0715	0.41	0.680	-0.1107	0.1696
GDP	-0.2127	0.2495	-0.85	0.394	-0.7017	0.2763
INF	-0.0729	0.2759	-0.26	0.791	-0.6136	0.4678
INR	0.1688	0.3004	0.56	0.574	-0.4201	0.7576
HHI	3.1564*	1.8154	1.74	0.082	-0.4018	6.7146
_cons	0.1322	0.2842	0.47	0.642	-0.4249	0.6892
Hansen Test					0.153	
AR(2)					0.329	

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

The SIZE coefficient is negative and statistically significant at the 5% level. This implies that smaller banks have a higher microenterprise lending propensity than larger ones. This result could be explained by the fact that while larger banks can easily diversify their loan portfolios, it is difficult for small banks to compete for large and medium business customer segments. Therefore, smaller commercial banks have more microenterprise loans in total outstanding business loans than large-scale commercial banks. This result is consistent with the characteristics of the Vietnamese banking market, where large commercial banks dominate lending to large and medium businesses.

The main customers of smaller banks are SMEs and individuals. Therefore, the proportion of microenterprise loans in total business loans of small banks in Vietnam is higher than that of larger banks. This result

supports the findings of Berger et al. (1998; 2004), Carter et al. (2004), Degryse et al. (2011), Petersen and Rajan (1995) and Sapienza (2002). These results are noticeable since larger banks have a higher microenterprise loan growth rate while smaller banks have a higher microenterprise lending propensity. This can be explained by the fact that larger banks had an advantage over smaller banks in lending in Vietnam. As a result, it is easier for them to extend loans than it is for smaller banks, as demonstrated by their higher loan growth rate.

The results also indicate a negative relationship between the NPL ratio and microenterprise lending propensity at the significance level of 10%. This implies that banks with high NPL ratios reduced risky lending activities, consistent with asymmetric information theory and credit rationing theory. The lack of information, credit history and collaterals lead the problem of asymmetric information more severely when it comes to microenterprises. Lending to microenterprises has been considered more risky than other types of loans. Consequently, in the light of credit rationing theory, banks may refuse microenterprise loans more than other loan types, decreasing the proportion of microenterprise loans in total business loans. This result is supported by Mkhaiber and Werner (2021) and Peek and Rosengren (1998).

Banks' incentives for risk-taking also explain the positive relationship between bank profitability and microenterprise lending propensity, as well as the negative relationship between risk aversion and microenterprise lending propensity. Banks with higher profitability have higher incentives for risk-taking. Therefore, they are more willing to lend to microenterprises. In contrast, banks with higher risk aversion are more cautious regarding risky microloans, since their high equity ratio to total assets offered them a lower risk-taking incentive than banks with higher financial leverage.

The statistically significant and positive relationship between market concentration and microenterprise lending propensity supports the information hypothesis presented by Petersen and Rajan (1995). This implies that less competition in the Vietnamese banking sector might encourage banks' risk-taking behaviour, such as granting loans to microenterprises.

5. Conclusion

The present study investigates the determinants of bank lending to microenterprises in Vietnam, an emerging market where banks play a major

role in financing firms. The study uses two proxies to measure bank lending to microenterprise behaviours: the microenterprise loan growth rate and lending propensity to microenterprises. The findings provide interesting insights into the variables determining bank lending to microenterprises in Vietnam. It is proved that bank loans to microenterprises depend on bank-specific macroeconomic factors and industry characteristics. The research results also show evidence of a positive relationship between economic growth rate and bank loans to microenterprises, explained by firms' higher profitability in the business expansion cycle.

Moreover, the inflation rate is negatively correlated with microenterprise lending propensity. Thus, decreasing the inflation rate might positively impact the propensity to lend to microenterprises. Banks' incentives for risk-taking explain the positive relationship between market concentration in the banking sector and microenterprise lending activities, as well as the negative relationship between credit risk and microloans. The evidence also supports the information hypothesis regarding the impact of bank industry characteristics on bank lending behaviours.

There are several major limitations of this study that can be addressed in future research. Due to the small sample size, the present study could not examine the relationship between bank ownership and bank lending to microenterprises. The dominance of state-owned banks characterises Vietnam's banking sector. Consequently, bank ownership structure differences may significantly impact lending behaviour in Vietnam. Second, the study could not consider the effect of economic shocks, such as the unusual event of the Covid-19 pandemic, on microenterprise loans. Banks tend to reduce their credit supply in times of macroeconomic instability because risk is greater, especially in countries that are vulnerable to economic shocks. The pandemic has had a huge impact on the financial systems of countries around the world, including both developed and developing economies. From a risk perspective, this could be considered as a macroeconomic shock that could cause systemic risk—the risk that would lead to the collapse of the financial system if not controlled and prevented. Further research could investigate the impact of these factors.

Based on the research results, the authors propose some recommendations for policymakers. The findings show that the industrial organisation of the banking sector in Vietnam has a significant relationship with bank lending to microenterprises. Therefore, policymakers can help

microenterprises overcome one of the key barriers to growth by influencing the structure of the banking system such that it is less competitive and dominated by large banks with high market shares. Moreover, policymakers should promote economic growth and maintain low inflation rates since it might lead to higher bank loans to microenterprises.

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