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Article

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BANKING & FINANCE | RESEARCH ARTICLE

Bank funding diversity, risk and profitability: Evidence from Vietnam in the context of the Covid-19 pandemic

Manh Hung Pham^{1*} and Nhat Minh Nguyen¹

Abstract: This study empirically explores the effects of bank funding diversity on Vietnamese commercial banks' profitability and risk in the context of the COVID-19 pandemic. The panel regression method was used to analyze quarterly data from 27 Vietnamese commercial banks from Q1-2016 to Q1-2021. The study findings demonstrate that commercial banks with diverse financing sources are more profitable and riskier. In the meanwhile, the COVID-19 outbreak did not diminish the short-term profitability of Vietnamese commercial banks, but it did increase their exposure to risk. On the basis of the empirical findings, this paper also proposes a number of strategies to assist Vietnamese commercial banks in operating more effectively and securely in the context of the COVID-19 pandemic.

Subjects: Quantitative Finance; Banking; Financial Economics

Keywords: Banks; funding diversity; risk; profitability; COVID-19; panel data; Vietnam

1. Introduction

Commercial banks are facing intense competition to be able to maintain effective and secure operations since the banking system is now evolving rapidly and is paired with the scientific and technological advancement of the digital revolution. The income diversification strategy is currently being pursued by commercial banks to compensate for the lower income from traditional banking activities (Gambacorta et al., 2014). Besides diversifying income sources, commercial banks also need to maintain capital certainty. Recent crises have shown the seriousness of the liquidity crunch problem (Khan et al., 2017). Therefore, policymakers and commercial banks are primarily concerned with ensuring funding certainty to improve the efficiency of the banking system. Funding diversification increases the security of a bank's funding by reducing its dependence on one or a few specific funding sources. Also, banks with more diversified funding will be able to hedge more risks and become safer, particularly during times of crisis. For instance, in the early phases of a crisis, depositors have a tendency to withdraw their deposits from the bank, which can lead to a "bank run". Banks may lessen their vulnerability to these threats by increasing their funding diversity.

On the effects of diversity on bank performance, there are two lines of research. Diversification can increase bank performance via scope economies (Diamond, 1991; Rajan, 1992). Banks can save on fixed costs by facilitating the spread of several business lines using customer information. Furthermore, risk diversification can benefit banks, according to portfolio theory, because different business lines have varying degrees of risk, resulting in more stable revenue and a lower default risk. However, diversification may result in a greater agency problem, which might lower the market value of the bank. In a complex institution, Laeven and Levine (2007) contend that it is

more challenging to align the incentives of the agency and investors. Thus, insiders may seek corporate diversification just to increase their own gains. Additionally, the managers may be required to make choices in areas of business where they lack comparable experience, which might reduce the bank's operational efficiency (Klein & Saldenberg, 1998). In addition to the conventional credit risks, the expansion into numerous business lines may also bring up new types of hazards, such as operational risk and market risk. Thus, the study's findings on this subject are likewise quite varied and pointed in many various directions. This research is being conducted to offer further empirical support for the link between funding diversification and bank performance in the Vietnamese context.

Similarly, there are two research lines on the impact of diversification on bank risk-taking. On the one hand, diversification reduces bank-specific risk by diversifying revenues and increase profitability through economies of scale (Baele et al., 2007; Stiroh & Rumble, 2006). Baele et al. (2007) found a non-linear relationship between diversification and specific risk of European banks for the period 1989–2004, which means banks with better diversification are safer. On the other hand, diversification tends to boost systemic risk, even though standalone risk is reduced (Wagner, 2010). The reason is that larger and more diversified banks have higher market beta and higher systemic risk because the more exposed a bank is to market or business cycle shocks, the higher the market covariance will be (Baele et al., 2007).

Another significant factor influencing this study is the environment of the Vietnamese financial sector. There are 49 banks in Vietnam's banking system, comprising 4 state-owned banks, 31 joint-stock commercial banks, 9 foreign-owned banks, 2 policy banks, and 1 cooperative bank. During the period 2011–2020, the process of restructuring Vietnam's banking sector has accomplished a number of remarkable triumphs, including the merger of weak banks with large banks without a single bank collapse and ensuring the stability of the whole financial system. However, the banking sector primarily supplies short-term capital for the economy, while the capital market is responsible for medium- and long-term funding in developed countries. In Vietnam, where the stock market has not yet developed, the economy's capital supply, especially medium- and long-term capital, continues to rely significantly on banks. When the majority of banks' mobilized funding is short-term, this presents several threats to the financial system. Besides, the financial system was analyzed using information from developed countries like the United States (US) and other European nations in earlier research. Vietnam offers an interesting case to analyze bank behavior because of its unique characteristics (Vo, 2020). Due to their disproportionate ownership, a limited number of major banks dominate the banking industry, with others vying for a considerably lower market share. Vietnamese banks are facing increasingly fierce competition as huge international banks actively enter the Vietnamese market, in addition to battling with each other for a reduced market share. Diversification is unquestionably a key approach in the bank's risk management in this highly competitive climate. The bank diversification strategy in the context of Vietnam is attracting an increasing amount of attention. The majority of research shows that diversification strategies boost risk-taking in Vietnam. For example, Batten and Vo (2016) examine the effect of diversification on Vietnamese commercial banks. Additionally, Vuong and Nguyen (2021) investigate the influence of income diversification and state ownership on risk-shifting in Vietnamese banks. The diversification of funding, on the other hand, has received less attention in prior research, which has mostly concentrated on the diversity of income sources. Few studies have assessed the effect of funding diversification in conjunction with income and asset diversification on bank efficiency such as Nguyen (2018), or on bank risk-taking in the pre-COVID-19 period, as investigated by Vo (2020).

The COVID-19 pandemic has direct economic consequences in addition to its health-related impact. Most governments have taken the initiative to rapidly mitigate the effects of economic and financial shocks by offering monetary and macroeconomic bailouts, such as easing regulatory requirements, delaying loan payments, and temporarily declassifying non-performing loans. The COVID-19 epidemic has had catastrophic consequences for bank financial performance and

stability both globally and regionally (EL-Chaarani et al., 2023; Elnahass et al., 2021). In this scenario, the COVID-19 pandemic was believed to significantly impact banking sector performance in various ways across countries (Demir & Danisman, 2021). Generally, reduced borrowing demand, decreased local and international trade, and limited foreign exchange transactions resulted in a sharp decline in bank income (Mirzae et al., 2022; Singh & Bodla, 2020; X. Li et al., 2020); a reduction in capacity to obtain funds (Kozak, 2021); and banks are vulnerable to a broad variety of risks (V. V. Acharya & Steffen, 2020; Dwiarti et al., 2021; Rizwan et al., 2020). In a similar context, the COVID-19 pandemic has forced Vietnamese commercial banks to take measures to extend and restructure loans to support businesses. This approach may result in banks incurring more bad debt, and endangering the stability of the whole financial system. Maintaining the stability of the bank's capital through diversification is crucial for banks, particularly in light of the COVID-19 pandemic. However, the academic literature examining how the epidemic affected the Vietnamese banking industry, is still in its infancy.

Based on the above-mentioned research gap, this paper focuses on examining the impact of funding diversity on the profitability and risk-taking of Vietnamese commercial banks to provide a more comprehensive view of bank diversification aspects. In summary, this study contributes to existing literature in the following ways: First, we enrich the knowledge about the effect of funding diversity on banks' profitability and risk-taking by extending the research of Vo (2020) and Nguyen (2018). Second, this study presents a further attempt to empirically evaluate the impact of COVID-19 on the performance of Vietnamese banks, adding to the growing literature on this topic (Elnahass et al., 2021; Tran et al., 2022) on a specific country case. Thirdly, the study findings are reliable when the robustness tests are thoroughly conducted using additional variables of profitability or the interaction between the epidemic and funding diversity. Besides, we also provide empirical evidence using the 2SLS instrumental approach, which confirms the robustness of fixed and random effects regression results. Consequently, the findings of this study may not only aid in identifying the ideal business models for Vietnamese banks, but also offer policymakers and bank regulators with useful recommendations about the dynamics of diversification impact in a crisis period.

The remainder of this study is organized as follows. Section 2 includes a review of the literature. Section 3 highlights the methodology adopted for the study. Further, Section 4 summarizes the primary findings and results. At last, conclusions and recommendations are discussed in Section 5.

2. Literature review and hypotheses development

2.1. Bank funding diversity and bank operation

According to the resource-based theory of the firm, increased levels of diversity should have a beneficial effect on performance owing to economies of scope and scale, which offer a competitive advantage (Geringer et al., 2000). In addition, company resources and know-how (for example: managerial, technical) may produce value when shared between businesses (Prahalad & Bettis, 1986). Thus, strategic diversifiers should outperform single-business businesses and less strategic diversifiers (Miller, 2006; Palich et al., 2000). Diversified firms may use both external and internal sources of loan and equity, giving them more financial flexibility (Lang & Stulz, 1994).

Similarly, one of the tactics used by banks to cope with uncertainty is business diversification, which may assist in enhancing their future performance (A. W. A. Boot, 2003; Elsas et al., 2010). According to Elsas et al. (2010), if banks expand their operations into other business sectors early on, they may develop the essential abilities to make effective business judgments in these new areas. When a certain business sector thrives, banks will be able to compete and reap greater earnings. In addition, A. Boot and Schmeits (2000) point out that diversified banks might lower their risk of insolvency by diversifying their activities across many products or marketplaces. One of the most significant performance drawbacks of bank diversification is the growth of agency issues

between corporate executives and small shareholders. The more diversified the organization, according to Laeven and Levine (2007), the more difficult it is to develop effective management incentive contracts. In other words, it makes aligning the motivations of outsiders with those of insiders more challenging. Bank insiders, in particular, may broaden their range of business activities if doing so enables them to obtain further personal benefits from the bank.

The relationship between bank funding diversity and profitability is still under debate in the literature. On the one hand, several studies suggest that diversifying funding sources helps banks improve profitability through cost reduction (Abbas et al., 2021; Vo, 2020). In addition, funding diversification has a positive and significant impact on cost efficiency and is beneficial to banks during the global financial crisis (Abbas et al., 2021). Furthermore, funding diversity improves the certainty of a bank's capital and has a positive impact on bank profitability. Instead of depending on one or two main funding sources, the bank can diversify funding sources to improve profitability by maintaining the certainty of the bank's capital. Ritz and Walther (2015) concluded that uncertainty about capital makes banks less confident when granting loans, thereby reducing bank profitability, especially in times of crisis. In the research paper on the impact of diversification on the cost and profit efficiency of commercial banks from six ASEAN countries, Nguyen (2018) used a dataset including 175 banks from Vietnam, Cambodia, Indonesia, Malaysia, the Philippines, and Thailand from 2007 to 2014 combined with the stochastic frontier approach (SFA). This study pointed out that banks with better funding diversity are more profitable and cost-efficient. On the other hand, maintaining multiple funding sources can increase banks' expenses and reduce their profits in some specific cases (Vo, 2020). For instance, Huang and Ratnovski (2008) provide the disadvantages of relying on wholesale funding in the sense that wholesale financiers may have an incentive to withdraw funding based on cheap and noisy signals of bank asset quality, which could lead to a significant decrease in profit due to a lack of cheap funding.

Similarly, there is still no consensus on assessing the relationship between funding diversity and bank risk. On the one hand, Abbas and Ali (2021) concluded that funding diversity decreases banks' risk and increases the stability of banks during the crisis period when studying the impact of asset, income, and funding diversification on the risk and stability of US commercial banks from 2002 to 2019. Other works demonstrate that banks with poorer structural liquidity are more susceptible to collapse in the future (Vazquez & Federico, 2015). On the other hand, several studies argue that banks with higher funding diversification are riskier (Cheng et al., 2015; V. Acharya & Naqvi, 2012; Vo, 2020). Due to the fact that banks with diversified funding sources often have low liquidity risk, bank managers tend to take more risks (V. Acharya & Naqvi, 2012) or engage in hazardous lending activities that result in higher risks (Cheng et al., 2015). Vo (2020) also found that Vietnamese commercial banks prefer to take more risks when their sources of funding are varied. From the above diverse theoretical and experimental evidence in the Vietnam context, we propose the following hypotheses:

Hypothesis 1 (H₁): Funding diversity increased Vietnamese banks' profitability.

Hypothesis 2 (H₂): Funding diversity increased Vietnamese banks risk-taking activities.

2.2. The COVID-19 pandemic and bank operation

To restrict the spread of the new COVID-19 virus, governments implemented mitigation strategies based on social distancing, national quarantines, and economic closures. The financial industry, and banks in particular, are anticipated to play a crucial role in absorbing the shock by providing urgently needed funding (V. V. Acharya & Steffen, 2020; Borio, 2020). As documented by the BIS, the capital and liquidity buffers of banks at the beginning of the crisis were significantly stronger than during the GFC (Borio, 2020; Lewrick et al., 2020). Nevertheless, the banking sector has been

severely impacted by a rapid increase in credit losses as well as prolonged uncertainty about the credit environment and the duration of the crisis.

Pandemic had a negative and substantial impact on the financial performance of banks (EL-Chaarani et al., 2023; Elnahass et al., 2021; Miklaszewska et al., 2021). On the customer side, the unpredictability of the pandemic's progression led to a fall in demand for consumer products and services, as well as investment and current capital (Kozak, 2021). According to Mirzae et al. (2022), decreasing retail consumer spending and fewer assets under management would likely reduce banks' fee income. These negative consequences of the crisis on the balance sheets of banks are worsened by substantial increases in operational expenses. According to Kozak (2021), the reduction in the number of possible borrowers and the chance to grant new loans resulted in a considerable decrease in the interest income and other fees and commissions associated with loan providing. By holding the net profit and not paying dividends to shareholders, banks undermine their capacity to obtain equity capital, making it more difficult for them to attract new capital from the market. J. Li et al. (2021) provide empirical evidence that banks experience a decline in loan growth and profitability during a pandemic. Additionally, they contend that diversification moderates the crisis by improving (decreasing) banking performance (risk).

In the event of endogenous shocks, such as the breakout of COVID-19, banks are susceptible to a broad range of risks that might have a significant impact on their stability. Elnahass et al. (2021) discovered a decrease in the banks' lending activity during the pandemic and, consequently, a significant increase in the operational and lending risks related to lower levels of loan demand. Using a quarterly panel of international banks from 2020:Q1 to 2021:Q1, Tran et al. (2022) found that during the pandemic, banks possessed higher accounting risk and more volatile returns, with a 1% increase in total COVID cases lowers the banks' z-score by 2.51%. A number of empirical studies also found that the pandemic increased banks' credit risk (Baret et al., 2020), lowered loan creditworthiness (Wu & Olson, 2020), and raised banks' systemic risk (European Central Bank ECB, 2020). The pandemic may also amplify the liquidity risk that financial institutions face when trying to access liquid funds: they may have to sell assets with poor returns or borrow money at exorbitant interest rates, both of which would have a devastating impact on their bottom lines. Banks store liquid assets during recessions and lower them during periods of stability to generate additional lending possibilities, as described by Delechat et al. (2012), who concluded that the demand for liquidity is countercyclical and rises during recessions. In the financial crisis, capital responses to bank risk-taking behavior differed from those in normal economic situations (Mateev et al., 2022), and the structure of funding sources, particularly deposits from individuals and enterprises, was very volatile. Liquidity risk is observed to be significantly affected during times of crisis; hence, funding diversification plays a crucial role in banking stability during the present COVID-19 crisis. Consistent with the previous study (Elnahass et al., 2021), we assume that banks experience a decline in earnings and a surge in risk during pandemics.

Hypothesis 3 (H₃): COVID-19 pandemic reduced Vietnamese banks' profitability.

Hypothesis 4 (H₄): COVID-19 pandemic increased Vietnamese banks risk-taking activities.

3. Data and empirical methodology

3.1. Data

At the end of 2020, the banking system in Vietnam has 35 commercial banks, including 4 state-owned commercial banks and 31 joint-stock commercial banks. This paper uses quarterly data from 27 Vietnamese commercial banks from Q1-2016 to Q1-2021 because of data availability. According to statistics from the State Bank of Vietnam (2021), as of June 2021, the total authorized capital of Vietnamese commercial banks was VND 477,606.99 billion, of which the total authorized capital of 27 selected commercial banks was VND 422,378.89 billion, accounting for

88% of the whole system. Therefore, the research sample is highly representative. We selected quarterly data from Q1-2016 to Q1-2021 to fill the time research gap in the research of Vo (2020) as well as assess the impact of the COVID-19 pandemic on the profitability and risk of Vietnamese commercial banks. The data was collected from the post-audit financial statements of Vietnamese commercial banks.

3.2. Model specification

Due to the nature of the data, the panel estimation technique is appropriate in this research. In addition, the heterogeneity among the individual banks is taken into consideration by the panel estimation technique (Kwashie et al., 2022). The equations are specified as follows:

$$ROA_{it} = \beta_0 + \beta_1 FDIV_{it} + \beta_2 SIZE_{it} + \beta_3 COST_{it} + \beta_4 LOAN_{it} + \beta_5 COVID + u_i + \varepsilon_{it} \quad (1)$$

$$Z - Score_{it} = \beta_0 + \beta_1 FDIV_{it} + \beta_2 SIZE_{it} + \beta_3 COST_{it} + \beta_4 LOAN_{it} + \beta_5 COVID + u_i + \varepsilon_{it} \quad (2)$$

Where: ROA presents the return on assets ratio, Z—Score presents banks' risk and FDIV, SIZE denotes banks' funding diversity score and banks' size. Again, COST and LOAN denote the normalized operating cost ratio and the normalized total loan ratio, respectively. β_0 is the intercept, β_i ($i = 1, 2, 3, 4, 5$) are the coefficients of the respective independent variables to be estimated, and ε is the error term. COVID is a dummy variable that takes the value 0 when there is no COVID-19 pandemic and gets the value 1 during the period from Q1-2020 to Q1-2021. i and t denote the i^{th} bank in year t and u_i is the individual specific effect which is constant over time.

3.3. Variable measurements

3.3.1. Bank profitability and risk

Bank profitability is an important indicator used to measure the performance of a bank. Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM) are typically used by analysts and researchers to evaluate the profitability of a bank, with ROA being the most prevalent. A broad variety of studies, as summarized in a review of the relevant academic literature, employed ROA to evaluate the profitability of banks (Berger, 1995; Flamini et al., 2009; Kapur & Gualu, 2011; Olweny & Mamba, 2011; Staikouras & Wood, 2011; Tan & Floros, 2012).

$$\text{Return on Assets (ROA)} = \frac{\text{Net income}}{\text{Total Assets}} \times 100\%$$

After the 2008 global financial crisis, researchers and policymakers had to reconsider the risks of banks as well as the ways to measure these risks. Today, the Z—Score has become a common indicator for gauging bank risk-taking, and Z—Score has gained widespread approval among academics and analysts (X. Li & Malone, 2016). The Z—Score is built on the work of Roy (1952) and developed by Boyd and Graham (1986), Hannan and Hanweck (1988) and Boyd et al. (1993). The Z—Score gained popularity due to its simplicity, yet it remains highly effective.

$$Z - Score = \frac{\text{Return on Assets} + \left(\frac{\text{Equity}}{\text{Assets}} \right)}{\text{Standard Deviation of Return on Assets}}$$

This paper calculated the standard deviation of asset returns using 4-quarter rolling windows. The most important feature of the Z—Score is that analysts can assess the variability in returns that can be absorbed by the capital of the bank without defaulting, based on the relationship between them. In other words, the Z—Score measures the distance from insolvency (Laeven & Levine, 2009). A bank with a higher Z—Score is thus safer, and vice versa, a bank with a lower Z—Score is riskier. Numerous research, such as Beck et al. (2012); Cihak and Hesse (2007); Delis et al. (2014); García-Marco and Robles-Fernández (2008); Khan et al. (2017); Laeven and Levine (2009); Houston et al. (2010); Tan (2016); and Vo (2020), employed Z—Score to assess bank risk. As a result of the remarkable features of this indicator, the Z—Score was chosen to evaluate the risk of banks in this study.

3.3.2. Determinants of bank profitability and risk

3.3.2.1. Bank funding diversity. The funding of a commercial bank is the monetary value created by the commercial bank itself or mobilized to be used for lending, investing, or performing other business. The capital sources of banks include liabilities and shareholders' equity. In Vietnam, the liabilities of commercial banks include (i) amounts due to the Government and the State Banks; (ii) deposits and borrowings from other credit institutions; (iii) deposits from customers; (iv) derivative financial instruments and other financial liabilities; (v) funds for finance, entrusted investments and entrusted loans; (vi) valuable papers issued; and (vii) other liabilities.

Regarding the measurement of bank funding diversity, this paper refers to the measurement methods of Nguyen (2018) and Vo (2020). In which the bank funding diversity index, or FDIV, ranges from 0 to 1. The bank with a higher FDIV will have a wider range of financing sources.

$$FDIV = 1 - \left[\left(\frac{EQU}{FUND} \right)^2 + \left(\frac{GOV}{FUND} \right)^2 + \left(\frac{IBD}{FUND} \right)^2 + \left(\frac{CD}{FUND} \right)^2 + \left(\frac{DER}{FUND} \right)^2 + \left(\frac{FF}{FUND} \right)^2 + \left(\frac{VP}{FUND} \right)^2 + \left(\frac{OTHER}{FUND} \right)^2 \right]$$

3.3.2.2. COVID-19 pandemic. The COVID-19 pandemic outbreak began in December 2019 in Wuhan, China, and continued to spread worldwide in 2020 and 2021. The COVID-19 pandemic has had a significant negative impact on the global and national economies. According to the Banking Academy of Vietnam's (2020) research titled "Evaluating the effect of the COVID-19 pandemic on Vietnam's economy," the COVID-19 pandemic drastically lowered credit demand in Vietnam. In fact, in 2020, the credit growth of the whole Vietnamese banking system will only reach 10.14%, lower than the credit growth rate of 12.14% in 2019. This reflects the fact that businesses and households reduced their credit demand because of the difficulties in production and consumption. This has a negative consequence, which is an increase in the percentage of nonperforming loans in commercial banks because of a rise in the absolute quantity of nonperforming loans and a decrease in the pace of credit growth. This research thus anticipates that during the COVID-19 pandemic, bank profitability will fall, and risk will grow. To proxy for COVID-19 in accordance with the method of Elnahass et al. (2021), COVID is a dummy variable that takes the value 0 when there is no COVID-19 pandemic and gets the value 1 during the period from Q1-2020 to Q1-2021.

3.3.2.3. Bank size. The relationship between bank size and bank profitability is still under debate in the literature. Velnampy and Nimalathasan (2010) concluded that the larger the bank size, the more profitable the bank can be by taking advantage of economies of scale. In contrast, Suleiman (2015), when studying the impact of size on the profitability of commercial banks in Jordan, pointed out that profitability tended to decrease as the volume of assets increased. Meanwhile, other studies did not find a relationship between the size and profitability of commercial banks (Tharu & Shrestha, 2019; Öhman & Yazdanfar, 2018)

Table 1. Components of the bank funding diversity indicator

FDIV	The measure of bank funding diversity, has a value from 0 to 1
FUND	Total funding of bank
EQU	Shareholders' equity
GOV	Amounts due to the Government and the State Banks
IBD	Deposits and borrowings from other credit institutions
CD	Deposit from customers
DER	Derivative financial instruments and other financial liabilities
FF	Funds for finance, entrusted investments and entrusted loans
VP	Valuable papers issued
OTHER	Other liabilities

Similarly, the literature on the relationship between bank size and bank risk remains inconclusive. Konishi and Yasuda (2004) studied the factors impacting the risk of 48 commercial banks in Japan over the period 1990–1999 and determined that larger banks had a lower risk because they had more resources to control risk than smaller banks. Similarly, Kasman and Kasman (2016) discovered a positive association between bank size and Z—Score while researching the influence of bank size on the risk of Turkish banks from 2002 to 2012. Some investigations, like the one by Barrell et al. (2010), dispute this finding. Barrell et al. (2010) used the GMM model with a dataset of 427 banks from 14 countries in 12 years (1996–2007) to conclude that large banks and fast-growing banks engage in riskier investment activities to increase returns and violate moral hazard principles when they are confident that a bank is too big to fail. Thus, this study expects a positive nexus between bank size and bank profitability as well as Z—Score.

$$SIZE = \text{Log}(\text{Total Assets})$$

3.3.2.4. Operating costs. Contrary to the variables listed above, most studies conclude that operating costs have a negative impact on bank profitability and Z—score. Ariyadasa et al. (2017) concluded that the increase in operating costs will reduce the profitability of banks when studying the factors affecting the profitability of banks in Sri Lanka from 2006 to 2014. In addition, Adelopo et al. (2018) discovered a negative correlation between operational expenses and bank profitability in all three phases: before, during, and after the financial crisis.

However, there are few studies examining the link between operational expenses and bank risk. Notably, Vo (2020) found a negative relationship between bank operating costs and Z—Score. A bank will have a lower Z—Score and become less stable if its operational expenses are greater. Thus, this study expects a negative relationship between operating costs and bank profitability as well as Z—Score. The operating cost variable will be calculated by normalizing it by the total assets.

$$COST = \frac{\text{Operating Costs}}{\text{Total Assets}} \times 100\%$$

3.3.2.5. Total loans. Although bank loans are the main source of income for banks and are expected to have a positive relationship with profitability, recent studies are still inconsistent. Gul et al. (2011) investigated the relationship between bank-specific and macroeconomic characteristics and bank profitability using the POLS model and a dataset of 15 commercial banks in Pakistan from 2005 to 2009. The research's conclusions indicate that banks that lend more will have better profitability ratios. This result is consistent with the work of Abreu and Mendes (2002) when studying the determinants of bank interest margins and profitability for European countries from 1986–1999. However, Hassan and Bashir (2012) discovered a significant negative relationship between total loans and bank profitability when researching how bank characteristics and the general financial context impact the performance of Islamic banks.

The relationship between total lending and bank risk has also been investigated in several studies. Notably, Montgomery et al. (2012) employed logistic regression analysis to investigate the causes of bank failures in Japan and Indonesia in 2011. They used data collected from banks in Indonesia from 1997 to 2003 and commercial banks in Japan from 1978 to 2001, including city banks, long-term credit banks, trust banks, and regional I and II banks. The findings reveal that banks with a higher loan-to-deposit ratio are riskier. Thus, total loans might have a positive relationship with bank profitability and has a negative connection with banks' Z—Score. Typically, the bank's total loans variable will be calculated by normalizing it by the total assets (Abreu & Mendes, 2002; Gul et al., 2011).

$$LOAN = \frac{\text{Total Loans}}{\text{Total Assets}} \times 100\%$$

3.4. Estimation strategy

In estimating equations (1) and (2), this paper employs the Hausman specification test to determine between the fixed effect model and the random effect model. The null hypothesis of the

Hausman test proposes that the random effect is appropriate, whereas the alternative hypothesis proposes that the fixed effect is appropriate. Therefore, the fixed effect estimator is appropriate if the null hypothesis is rejected in the case where the Hausman test is significant at the significance level of 5%. In contrast, if the test statistic is insignificant, then the null hypothesis cannot be rejected, and the random effect estimator is appropriate. The system generalized method of moments (GMM) estimation was also performed to test in this study. However, several studies demonstrate that when the focal effect is minimal, the GMM model exhibits weak statistical power, type II errors occur more frequently, and a system GMM estimator is more likely to miss a truly important relationship (J. Li et al., 2021). The GMM approach will thus be investigated for use in future investigations when the data structure is more compatible.

The research results are reliable when the models do not violate econometric assumptions such as heteroscedasticity and autocorrelation. This paper employs the Modified Wald test to check for the presence of heteroscedasticity. The null hypothesis of the Modified Wald test states that the variances for the errors are equal (homoscedasticity) whereas the alternative hypothesis suggests that the variances for the errors are not equal (heteroscedasticity). In the Modified Wald test, the null is preferred because if the residual phenomenon has a constant variance, it shows that the coefficients of the estimated regression equation are unbiased estimates of the true coefficients of the independent variables in the population. In addition, this paper also employs the Wooldridge test to check for the autocorrelation problem. In a time series, autocorrelation occurs when a variable and its lag version are observed to be correlated with one another over time. Autocorrelation causes the estimated variances of the regression coefficients to be biased, leading to unreliable hypothesis testing. The null hypothesis is preferred in the Wooldridge test, in which there is no autocorrelation.

4. Empirical results and discussion

4.1. Descriptive statistics

Table 1 includes components of the bank funding diversity indicator of Vietnamese commercial banks. Meanwhile, Table 2 shows the descriptive statistics of the variables. The data used for regression analysis is panel data, including 567 observations of 27 commercial banks over the 21 quarters from Q1-2016 to Q1-2021. The ROA of the Vietnamese banking sector has a mean value of 0.0023 per quarter, and the range is from -0.0061 to 0.01 with a standard deviation of 0.0022 . The high standard deviation of the Z-Score indicates that the risk-taking of Vietnamese banks varies greatly over time. While state-owned commercial banks are typically safer, joint-stock commercial banks often incur more risks to achieve profits. FDIV has a mean value of 0.4551 , the minimum value of 0.1873 , the maximum value of 0.6971 , and the standard deviation of 0.1125 . These numbers demonstrate the various degrees of financing variety across Vietnamese commercial banks. The majority of the financing sources for Vietnamese commercial banks, approximately 71%, come from customer deposits. The average profit and funding diversity of Vietnamese commercial banks increased throughout the COVID-19 period, but a lower Z-score indicates that these institutions are also more prone to accept more risk.

The correlation coefficient measures the strength of the association between two variables. From Table 3 results, the correlation coefficients of the variables are not greater than the standard rule of thumb of 80%, so the independent variables have low correlations and are suitable for regression (Hair et al., 2006; Judge et al., 1985).

4.2. Regression estimates and discussion

This paper uses regression models for panel data, including the fixed effects and the random effects model, to estimate the determinants of bank profitability and risk. Table 4 contains the regression results derived from the fixed effects model. In the Z-Score model, however, the variables have coefficient signs that contradict predictions and are not statistically significant, thus the authors conduct diagnostic tests to determine the model's suitability.

Table 2. Descriptive statistics of variables

Variable	Observations	Mean	Std. Dev.	Min	Max
Overall					
ROA	567	0.0023	0.0022	−0.0061	0.0100
Z – Score	567	190.8164	224.4658	19.0245	3249.9450
FDIV	567	0.4551	0.1125	0.1873	0.6971
SIZE	567	14.2001	0.4669	13.2465	15.1928
COST	567	0.0044	0.0015	0.0009	0.0105
LOAN	567	0.6172	0.0880	0.2822	0.7881
COVID	567		0.4263	0	1
Before COVID-19 period					
ROA	432	0.0021	0.0020	−0.0061	0.0095
Z – Score	432	200.9967	247.8121	19.0245	3249.9450
FDIV	432	0.4547	0.1096	0.1873	0.6971
SIZE	432	14.1645	0.4634	13.2465	15.1732
COST	432	0.0045	0.0015	0.0011	0.0105
LOAN	432	0.6101	0.0901	0.2822	0.7828
During COVID-19 period					
ROA	135	0.0030	0.0023	−0.0020	0.0100
Z – Score	135	157.4254	117.2873	20.0543	663.4215
FDIV	135	0.4559	0.1217	0.2131	0.6503
SIZE	135	14.3126	0.4604	13.3077	15.1928
COST	135	0.0042	0.0014	0.0009	0.0083
LOAN	135	0.6404	0.0771	0.4181	0.7881

Source: Authors' calculation

Table 3. The pairwise correlation matrix for variables

	ROA	Z – Score	FDIV	SIZE	COST	LOAN	COVID
ROA	1.0000						
Z – Score	−0.1131	1.0000					
FDIV	0.3865	−0.0883	1.0000				
SIZE	0.2900	0.0141	−0.0303	1.0000			
COST	0.3839	−0.1149	0.2729	−0.1177	1.0000		
LOAN	0.0899	−0.0077	−0.3364	0.1975	0.0222	1.0000	
COVID	0.1890	−0.0839	0.0043	0.1322	−0.0665	0.1445	1.0000

Source: Authors' calculation

Table 5's diagnostic test results show that the fixed effects model fits the ROA data series, whereas the random effects model fits the Z-score data series. Both models have heteroscedasticity problems, but the Z-score model also has an autocorrelation issue. To address these issues, this paper applies the fixed effects model to the profitability model while employing the feasible generalized least squares method (FGLS) for the Z-score model. The final research results are shown in the table below.

The main regression results of the paper are shown in Table 6. First, the bank funding diversity index (FDIV) has a positive impact on ROA and is statistically significant at the 5% significance level. This result is consistent with the expectations of this paper and similar to the research results of Nguyen

Table 4. Regression results with fixed effects model

	ROA		Z - Score	
	Coefficient	P-value	Coefficient	P-value
FDIV	0.004311	0.035**	194.1309	0.446
SIZE	0.004336	0.005***	-140.8858	0.312
COST	-0.181477	0.092*	-1963.932	0.788
LOAN	0.006909	0.019**	593.1258	0.323
COVID	0.000069	0.643	-41.55505	0.292
_cons	-0.064785	0.002	17553734	0.338

Note: The symbols *, **, and *** stand for significance at the 10%, 5% and 1% level, respectively

Source: Authors' calculation

Table 5. Diagnostic tests

Hausman test		
	Chi-Sq. Statistic	P - value
ROA model	60.77	0.0000
Z - Score model	6.68	0.2456
Modified Wald test for groupwise heteroscedasticity		
	Chi-Sq. Statistic	P - value
ROA model	2180.33	0.0000
Cook-Weisberg test for heteroskedasticity		
	Chi-Sq. Statistic	P - value
Z - Score model	5.14	0.0233
Wooldridge test for autocorrelation		
	F (1,26)	P - value
ROA model	1.343	0.2571
Z - Score model	28.559	0.0000

Source: Authors' calculation

Table 6. Final regression results

	ROA (fixed effects model)		Z - Score (FGLS model)	
	Coefficient	P-value	Coefficient	P-value
FDIV	0.004311	0.035**	-89.76002	0.084*
SIZE	0.004336	0.005***	39.82837	0.000***
COST	-0.181477	0.092*	-17518.41	0.000***
LOAN	0.006909	0.019**	-71.5929	0.246
COVID	0.000069	0.643	-19.28087	0.088*
_cons	-0.064785	0.002	-240.9735	0.108

Note: The symbols *, **, and *** stand for significance at the 10%, 5% and 1% level, respectively

Source: Author's calculation

(2018) and Vo (2020). Banks with higher funding diversification will have greater funding certainty, allowing them to raise profitability. Conversely, if the certainty of banks' capital is reduced, it will lead to a decline in the profitability of banks (Ritz & Walther, 2015). However, this study found a negative relationship between bank funding diversity and Z-Score. The coefficient of FDIV in the Z-score model is calculated as -89.76002 and statistically significant at the 10% significance level. It means banks

with a higher level of funding diversity tend to undertake more risky activities, which leads to higher risk. Therefore, we accept Hypothesis 2, which states that more funding diversification may lead to banks taking on more risk. Our results are in line with those of V. Acharya and Naqvi (2012), Cheng et al. (2015), and Vo (2020). Vietnamese commercial banks prefer to take more risks when their sources of funding are varied (Vo, 2020). When banks draw more widespread deposits, they minimize financing liquidity risk, therefore bank managers engage in aggressive lending operations to gain better remuneration (Cheng et al., 2015). Thus, reliable funding encourages banks to take on more risk (V. Acharya & Naqvi, 2012). This contradicts the conventional wisdom in which the availability of additional financing sources has always encouraged managers to choose better lending opportunities (Abbas & Ali, 2021; AlKhouri & Aroui, 2019), and if additional financing sources are available, banks may raise their commitments at higher rents and pick low-risk investments. The negative correlation between bank financing and a bank's Z-score may be mostly attributable to the high growth rate of valuable papers issued in recent years. The growth rate of valuable papers issued by Vietnamese commercial banks has always been positive and peaked at 48% in 2019. The issuance of valuable papers such as certificates of deposit and long-term bonds will assist the bank in improving Tier 2 capital. However, this is simply a short-term solution, as issuing valuable papers to raise capital comes with a number of risks, including interest rate and liquidity risk, that might have an impact on the bank's future stability.

Second, the coefficient of COVID in the Z—Score model is calculated as -19.28087 and statistically significant at the 10% significance level. This indicates that the accounting risk faced by banks is greatly increased when pandemics occur. The negative effect of the outbreak on banking soundness is consistent with earlier literature (Elnahass et al., 2021; Tran et al., 2022). Regarding the ROA model, the variable COVID is not statistically significant at the 1%, 5%, and 10% significance levels. This implies that the impact of the COVID-19 pandemic on bank profitability has yet to be observed. This conclusion differs from that of Elnahass et al. (2021), J. Li et al. (2021), who demonstrate that the pandemic has a negative relationship with bank profitability. Due to a variety of factors, including lockdowns, layoffs, and a sluggish economy, the pandemic could elevate banks' credit risk (Baret et al., 2020); yet, even two years after the outbreak, Vietnamese banks' NPLs ratio is still under tight control. As a result, the effect of COVID-19 on the uncertainty of Vietnamese banks is readily apparent, although the impact on profitability indicators may require additional time to verify.

Third, bank size (SIZE) has a positive relationship with both ROA and Z—Score and is statistically significant at the 1% significance level. This conclusion conforms to the expectation of this study and is comparable to the findings of EL-Charani et al. (2023), Kasman and Kasman (2016), Konishi and Yasuda (2004), and Velnampy and Nimalathasan (2010). Larger banks can take advantage of their size and reputation to mobilize deposits at lower interest rates and provide loans at higher interest rates, thereby achieving better profits. Smaller commercial banks must mobilize deposits at higher interest rates, resulting in diminished earnings. When it comes to the Z-Score, bigger banks are safer than smaller ones because they have more capital to devote to risk management. Moreover, in order to attract borrowers, smaller banks with a poorer reputation must frequently seek out riskier customers and loosen some lending standards, such as requiring less collateral. Therefore, the risk associated with smaller banks is often greater than that involved with high street banks. These results corroborated those by Demir and Danisman (2021), who examined the effect of many bank-specific characteristics on the robustness of the banks during the COVID-19 pandemic and found that a larger bank size was positively correlated with greater resilience.

Fourth, operating costs (COST) have a negative impact on the ROA and Z—Score of Vietnamese commercial banks, which coefficients are significant at 10% and 1% levels, respectively. High operational expenses in banks indicate inadequate cost management, resulting in decreased earnings and higher risk. This is especially true during recessions like the COVID-19 pandemic, since expenditures continue to rise while bank earnings are often drastically cut. The implementation of digital transformation and the creation of services based on contemporary technology; however, may both save costs and boost operational effectiveness for certain banks (Miklaszewska et al., 2021).

Finally, the coefficient of the total loan variable (LOAN) in the ROA model is calculated as 0.006909 and is statistically significant at the 5% significance level. This result is consistent with the expectations of this paper and similar to the research results of Gul et al. (2011); Abreu and Mendes (2002). In Vietnam, there is a substantial difference between deposit and lending interest rates, therefore, the more banks lend, the more profitable they would be. The association between loan size and bank risk-taking, on the other hand, has not been investigated in the regression model.

4.3. Robustness test

Endogenous issues frequently appear in panel data regression. The presence of endogeneity would bias fixed effects parameter estimates (Schultz et al., 2010). In this paper, the explanatory variable, funding diversity as measured by FDIV in the model, is influenced partly by the banks' profitability and risk. This means that the banks' profitability, risk, and funding diversity can all have an impact on one another, and simultaneity causes endogeneity. To solve the endogenous issue, this paper adopted a two-stage least squares (2SLS) model combined with an instrumental variable approach, with the idea being to find a factor known as an instrumental variable that determines the funding diversity but does not correlate with the error term. Similar to Velasco (2022), this paper uses the variable "listed time" as an instrumental variable and measures the time that Vietnamese commercial banks have listed on the stock exchange (quarterly). The longer banks are listed on the stock exchange, the more reputable they become, and the easier it will be to engage in growth strategies such as diversification (Laeven & Levine, 2007) which includes funding diversity. Particularly, banks that are listed will be able to readily mobilize a variety of funding sources, such as issuing shares or bonds on the stock market. The Sargan test for over-identifying restrictions is used to further analyze the suitability of our instrumental variable. The instrument is relevant (non-zero correlation with the endogenous variable of bank diversification) and valid (not correlated with the error term). The results of the 2SLS model are shown in Table 7:

In general, the regression findings provided in Table 8 for the 2SLS model are comparable to those in Table 7 for fixed and random effects models. Accordingly, funding diversity improves the profitability of Vietnamese commercial banks but also exposes them to take more risks. The results on the impact of COVID-19 on banks' risk taking are also consistent with the random effects model. Notably, the 2SLS model discovered a statistically significant positive correlation between COVID-19 and the profitability of Vietnamese banks.

To examine the robustness of the COVID-19 epidemic's effect, we substitute the COVID dummy variable in the model with a variable representing the interaction between capital diversification and COVID-19. Table 8 shows the impact of funding diversity and COVID-19 interaction on bank

Table 7. Results of the 2SLS model robustness test

	ROA		Z - Score	
	Coefficient	P-value	Coefficient	P-value
FDIV	0.00701	0.000***	−467.710	0.013**
SIZE	0.00136	0.000***	39.5598	0.000***
COST	0.45842	0.000***	−5830.81	0.436
LOAN	0.00308	0.004***	−197.753	0.162
COVID	0.00077	0.000***	−44.3010	0.050**
_cons	−0.02442	0.000***		
Sargan overidentification test p-value	0.2306		0.3120	

Note: The symbols *, **, and *** stand for significance at the 10%, 5% and 1% level, respectively

Source: Authors' calculation

Table 8. Impact of the funding diversity and COVID-19 interaction

	Coefficient			Coefficient	
	ROA	Z – score		ROA	Z – score
FDIV	0.00417** (0.033)	–94.9612* (0.064)	FDIV	0.00429** (0.031)	–79.1796 (0.137)
SIZE	0.00456*** (0.001)	38.5012*** (0.000)	SIZE	0.00423*** (0.005)	38.9231*** (0.000)
COST	–0.18459* (0.090)	–15723.3*** (0.000)	COST	–0.17879* (0.100)	–17864.8*** (0.000)
LOAN	0.00692** (0.018)	–75.1953 (0.209)	LOAN	0.00690** (0.019)	–79.6028 (0.201)
			FDIV*COVID	0.00022 (0.440)	–35.8640 (0.114)
_cons	–0.06784	–230.361	_cons	–0.063286	–227.113

The symbols *, **, and *** stand for significance at the 10%, 5% and 1% level, respectively.

P-value given in parentheses

Source: Authors

Table 9. Impact of funding diversity on banks' ROE in the COVID-19

	Coefficient			Coefficient			Coefficient	
	ROE	P – value		ROE	P – value		ROE	P – value
FDIV	0.02838	0.027**	FDIV	0.03334	0.007***	FDIV	0.03020	0.016**
SIZE	0.05915	0.000***	SIZE	0.05083	0.000***	SIZE	0.05988	0.000***
COST	–1.38703	0.068*	COST	– 1.26957	0.093*	COST	– 1.43027	0.061*
LOAN	0.07325	0.000***	LOAN	0.07255	0.000***	LOAN	0.07327	0.000***
COVID	–0.00261	0.175				FDIV*COVID	– 0.00615	0.128
_cons	–0.86320	0.000		– 0.74798	0.000	_cons	– 0.87421	0.000

Note: The symbols *, **, and *** stand for significance at the 10%, 5% and 1% level, respectively

Source: Authors' calculation

profitability and risk-taking. The individual effect of bank funding diversification is evident and consistent with Table 7's regression findings. However, the interaction between funding diversification and COVID-19 (FDIV*COVID) has no statistically significant impact on bank risk and return.

The ROE is used as an alternative dependent variable proxied for the probability of banks to test the robustness of the results. The results are shown in Table 9. The vast majority of ROE model findings are identical to ROA model outcomes. With the exception of COVID, which lacks statistical significance, the signs of the independent variables in the ROE model are similar to those in the ROA model. Banks with a larger degree of funding diversification will have greater funding certainty, enabling them to increase their profitability. In summary, the results of the check of robustness confirm that the research results of the paper are reliable.

5. Conclusion and implications

This study empirically explores the effects of bank funding diversity on Vietnamese commercial banks' profitability and risk in the context of the COVID-19 pandemic. The study findings reveal that bank funding diversity (FDIV), bank size (SIZE), and total loan (LOAN) have a favorable effect on bank profitability, but operational expenses (COST) have a negative impact. During the COVID-19 period, the Vietnamese bank's profits have not been affected by the pandemic, which may be due to the time lag, and this effect may need further time to be confirmed. According to the Z-Score model, banking funding diversity (FDIV), operational expenses (COST), and COVID

are elements that raise the bank's risk. Recent increases in the issuance of valuable papers have enabled banks to raise additional Tier 2 capital and diversify their financing sources, but they also expose the bank to interest rate risk and liquidity risk. The COVID-19 pandemic also raises the risk of non-performing loans for commercial banks. Besides, bank size (SIZE) shows a positive correlation with Z-Score, suggesting that the bigger the bank, the more stable and low-risk it is.

This study provides theoretical contributions in the following ways. We add to the empirical literature on bank diversification by offering new evidence on the effect of funding diversity on Vietnamese bank performance and risk taking. Specifically, under the diversification theory, our results complement previous findings that funding diversification raises bank risk (Vo, 2020) and positively affects bank profitability (Nguyen, 2018; Vo, 2020). The study also provides valuable insights to ongoing debate related to the COVID-19 implications for bank stability. We figured out that the riskiness faced by banks is greatly increased during pandemic crisis which aligns with the findings of Elnahass et al. (2021); Tran et al. (2022). These conclusions are all confirmed through the robustness tests of the study. However, it may take extra time to validate the effect of COVID-19 on profitability measures for Vietnamese commercial banks.

This study also offers some policy implications in light of the research findings to assist Vietnamese commercial banks in running more effectively and securely. Banks must diversify their financing sources while expanding their size, and raising shareholder equity is the most secure and effective strategy. Commercial banks cannot only rely on Tier 2 capital to meet capital adequacy regulations. Instead, commercial banks need to raise capital by offering shares to investors or increasing accumulated profits to improve Tier 1 capital. Increasing equity or Tier 1 capital also allows banks to lend more, thereby increasing total assets and being able to scale up. Further, banks need to optimize operating costs to increase profits and minimize risks, especially during the crisis period of the COVID-19 pandemic. In order to maintain a credible database of predictions and limit investment in high-risk industries, banks must establish a system for risk forecasting that incorporates all types of dangers. In addition, banks also need to improve the professional skills of bank staff via training courses to ensure the highest efficiency in credit quality review, appraisal, inspection, and supervision. Depending on the bank's financial health and circumstances, the State Bank of Vietnam and the Ministry of Finance permit state-owned banks to utilize yearly dividends to boost capital for the next year in the form of stock dividend payments. In addition, it is important to expedite the implementation of equitization and lower the State's ownership percentage in state banks (now between 65% and 95%). The strategy of raising capital by selling shares to foreign strategic investors is advantageous because foreign investors have substantial financial potential and managerial expertise.

However, this paper has the following limitations. First, this paper provided a model to examine the impact of five factors (bank funding diversity, bank size, operating cost, total loans, and COVID-19 pandemic) on Vietnamese commercial banks' profitability and risk. There may be several more variables, such as macroeconomic variables, that impact the bank's profitability and risk but are not included in the model. In addition, this research was only able to collect information on 27 of the 35 Vietnamese banks because some of them are undergoing restructuring and do not publish the information in their financial reports. Therefore, in the future study, the authors will attempt to collect data from all Vietnamese commercial banks and utilize macroeconomic parameters to analyze the risk-taking of Vietnamese commercial banks in a more complete manner. In terms of a regression approach, adopting quarterly fixed effects to capture aggregate time shocks is a useful idea for further research. Furthermore, studies argue that system the GMM estimator surpasses the fixed effects estimator in bias and efficiency; hence, we will adopt the GMM model for panel datasets in the follow up study to comprehensively address the endogeneity issue.

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Appendix

List of 27 Vietnamese commercial banks in the study

	Bank name
1	An Binh Commercial Joint Stock Bank
2	Asia Commercial Joint Stock Bank
3	Bac A Commercial Joint Stock Bank
4	Viet Capital Commercial Joint Stock Bank
5	Bank For Investment and Development of Vietnam
6	Vietnam Joint Stock Commercial Bank for Industry and Trade
7	Vietnam Commercial Joint Stock Export Import Bank
8	Ho Chi Minh Development Joint Stock Commercial Bank
9	Kien Long Commercial Joint Stock Bank
10	Lien Viet Post Joint Stock Commercial Bank
11	Military Commercial Joint Stock Bank
12	Vietnam Maritime Commercial Joint Stock Bank
13	Nam A Commercial Joint Stock Bank
14	National Citizen Commercial Joint Stock Bank
15	Orient Commercial Joint Stock Bank
16	Vietnam Public Joint Stock Commercial Bank
17	Saigon Commercial Joint Stock Bank
18	Southeast Asia Commercial Joint Stock Bank
19	Saigon Bank for Industry and Trade
20	Saigon Hanoi Commercial Joint Stock Bank
21	Sai Gon Thuong Tin Commercial Joint Stock Bank
22	Vietnam Technological and Commercial Joint Stock Bank
23	Tien Phong Commercial Joint Stock Bank
24	Vietnam International Commercial Joint Stock Bank
25	Vietnam Asia Commercial Joint Stock Bank
26	Bank for Foreign Trade of Vietnam
27	Vietnam Prosperity Joint Stock Commercial Bank



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