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## Article

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# The effects of bank-specific and macroeconomic determinants on CASA ratio of listed joint stock commercial banks in Vietnam

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## ABSTRACT

This study aims to assess the situation of the Current Account and Savings Account ratio (CASA ratio) among listed joint stock commercial banks (JSCBs) in Vietnam. Analytical data sourced from the Financial Statements and Annual Reports of 27 banks over 6 years (2018 – 2023) reveals that the CASA ratio in the period surveyed is relatively low and exhibits significant variation across different groups. Employing panel regressions, including Pooled Ordinary Least Squares (OLS), Fixed Effects Model (FEM), Random Effects Model (REM) and Generalized Method of Moments (GMM), the research examines the factors influencing CASA ratio, with GMM proving to be the best-fitting model. The analysis indicates that profitability and bank size are significant determinants of the CASA ratio, whereas economic growth, inflation, and liquidity exert a negative impact on CASA. Moreover, empirical evidence regarding the influence of real interest rates and non-performing loan ratios on CASA among JSCBs in Vietnam was not found. These findings hold implications for JSCBs and policymakers, offering insights to enhance deposit mobilization in Vietnam's banking sector, thereby promoting efficient capital utilization and ensuring system stability in the future.

## PUBLIC INTEREST STATEMENT

Increasing the CASA ratio is one of the most important goals of commercial banks to reduce funding costs and enhance their competitive capacity. In this paper, we evaluate the current situation of the Current Accounting Savings Account ratio (CASA) of listed joint stock commercial banks in Vietnam. Using panel regressions employing techniques such as Pooled-ordinary least squares (OLS), fixed effects model (FEM), random effects model (REM), and Generalized Method of Moments (GMM), we examine the impact of factors on CASA ratio, with GMM demonstrating the best fit to the model. The findings are meaningful to both commercial banks and the policymakers, providing insights to stabilize deposit mobilization of Vietnamese commercial banks, thereby ensuring the efficient utilization and safety of capital within the banking system in the future.

## ARTICLE HISTORY

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## SUBJECTS

Banking; Corporate Finance; Finance

## 1. Introduction

Banks play a crucial role in driving the economy in Vietnam. The increasing number of commercial banks in recent years has spurred efficiency and competition in the banking sector. Bank loans are the primary source of capital for Vietnamese enterprises, and bank's lending decisions largely depend on banks' ability to mobilize funds. Interestingly, equity capital accounts for only a minority share of the total capital of commercial banks, as opposed to approximately 70% of customer deposits. These deposits, which are considered liabilities, form the cornerstone of commercial bank operations. They consist of term deposits-like fixed and recurring deposits and non-term deposits – like Current Accounts and Savings Account (CASA). CASA is the amount of money that gets deposited in the current and savings accounts of bank customers. They are used for daily transactions and are valid as long as the customer wants them to be.

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Attracting CASA deposits has become a fierce battleground among commercial banks, with a high CASA ratio being seen as a significant achievement for all banks.

In recent years, capital mobilization, including CASA, has encountered numerous challenges stemming from various micro and macro factors. Following the COVID-19 pandemic, there has been a notable surge in gold, stock, and real estate prices along with a downward trend in deposit interest rates. Consequently, depositing in commercial banks is no longer enticing as before. Additionally, heightened competitive pressures have underscored the necessity for commercial banks to devise suitable capital mobilization strategies to fulfill the economy's capital requirements.

Several pieces of research on the importance of the CASA ratio and the factors affecting this ratio have been conducted by some authors, but the results remain inconsistent. Erna and Ekki (2004) pointed out several factors that affect the amount of deposits at banks in Indonesia, such as inflation, industrial production index, bank size, profitability, and belief factor, while GDP and interest rates have no impact on the number of deposits. In contrast, inflation, macroeconomic instability, profit rates, bank size and liquidity are factors that significantly affect the deposits of banks in Ghana. Furthermore, most studies in Vietnam focus on variables related to customer evaluation of factors belonging to bank-specific characteristics on the CASA ratio of commercial banks (reputation, bank size, interest rates and bank service quality), without mentioning macro factors. In the context that business activities and capital mobilization of commercial banks have changed over time and depend on many factors, research on factors affecting the amount of deposit needs to be considered and adjusted accordingly. Our paper makes several significant contributions. Firstly, it identifies and assesses the impact of bank-specific factors (bank size, liquidity, profitability, non-performing loan ratio) and macroeconomic determinants (economic growth, inflation rate, real interest rates) on the CASA ratio of JSCBs in Vietnam. Secondly, the paper compares CASA ratios of different JSCBs in Vietnam and determines whether variations in these ratios can be attributed to specific bank-specific or macroeconomic determinants. Thirdly, our study uses the data extracted from the Financial Statements of JSCBs spanning a 6-year period (2018 – 2023). This is the latest data related to the CASA ratio of JSCBs. Finally, we provide policy and strategic recommendations for bank management and policymakers on how to optimize the CASA ratio in light of the identified determinants.

The remainder of the paper is structured as follows: section two presents the Background of the CASA ratio of JSCBs in Vietnam, followed by a theoretical framework, literature review and hypothesis development. The research methodology, results, and discussion are presented in sections five and six, respectively. Finally, the conclusions and implications of this study are discussed in the last section.

## 2. Background of CASA ratio of JSCBs in Vietnam

CASA ratio has emerged as a critical metric for assessing commercial banks' financial health and competitiveness. As the banking sector has evolved, driven by rapid economic growth and increased competition, the importance of low-cost funding sources like CASA has become more pronounced. In Vietnam where the financial landscape is shaped by a mix of state-owned banks and a growing number of private and foreign banks, optimizing the CASA ratio is essential for enhancing profitability and stability. Sustainable CASA ratio growth is always one of the strategic goals of many commercial banks. This can be explained by two main reasons. Firstly, a high and stable CASA ratio indicates that commercial banks can mobilize more capital at lower costs, thereby reducing reliance on expensive funding sources and improving overall profitability. Secondly, a high and stable CASA index indirectly reflects the effectiveness of commercial bank service ecosystem development policies. This suggests that the bank is investing in modern technology, maintaining high service quality, and offering value-added products associated with demand deposit services, thereby attracting numerous customers to open accounts. This reaffirms a bank's position in the market.

With Vietnam moving towards a cashless society, there has been a rise in the number of individuals opening bank accounts for mobile and internet banking transactions. Governed by regulations established by the State Bank of Vietnam (SBV), banks are encouraged to enhance the CASA ratio to reduce reliance on costly funding sources and improve overall profitability. In 2021, Vietnamese banks saw an increase in CASA ratio from 17.0% to 19.4%. However, an excessively high CASA ratio may also pose risks

for banks, particularly in situations where customers withdraw funds simultaneously. High liquidity pressure may compel banks to rely on higher-cost capital sources, such as term deposits, or to issue securities. Furthermore, a disproportionately high CASA ratio might indicate that banks are unable to fully utilize other capital sources, such as long-term loans. Additionally, many banks continue to encounter challenges in optimizing CASA ratios due to factors including shifting consumer preferences, a lack of effective digital banking solutions, and increased competition from both traditional and non-bank financial institutions. As the market evolves, maintaining financial stability requires a careful balance between the CASA ratio and other mobilized capital sources. To address this issue, commercial banks can identify the factors influencing the CASA ratio and implement appropriate measures to mitigate these impacts.

### 3. Theoretical framework

The most frequently cited theories in studies examining the factors affecting commercial bank deposits are the Keynesian Theory of Money and three theories related to consumer behavior concerning spending and saving: the Permanent Income Hypothesis (Friedman, 1957), the Life Cycle Model (Modigliani & Brumberg, 1954) and the Buffer-Stock Theory (Carroll et al., 1992; Deaton, 1991). These theories provide a framework for understanding how individuals' savings and spending behaviors affect bank deposits and overall financial stability. The Keynesian Theory emphasizes the role of money supply in influencing economic activity, while the other three theories focus on the psychological and behavioral aspects that drive consumer decisions regarding savings and expenditure.

According to the Keynesian Theory of Money, there are three primary motives for holding money: transactions, precautionary and investment (Keynes, 1936). These motives are addressed through three distinct types of deposits: current accounts and savings accounts with flexible maturities. Deposits can be viewed from the perspective of individuals seeking income to meet their household expenditures and from the perspective of businesses needing funds for their operations. While current accounts serve daily transactional needs, savings accounts cater to individuals who wish to save and increase their income. Additionally, depositors may also hold funds for precautionary motives in response to risky situations (Haron et al., 2006).

The Permanent Income Hypothesis (Friedman, 1957) is a theory about consumer spending that suggests individuals will spend money in line with their expected long-term average income. This expected long-term income is viewed as a fixed level that can be spent safely. Based on this hypothesis, Friedman (1957) predicted that individuals will only save if their current income is higher than this expected fixed income level, in order to protect against potential future income declines.

Conducting a simultaneous and independent study, Modigliani and Brumberg (1954) proposed the Life Cycle Hypothesis, which describes how individuals plan their consumption and saving behavior throughout their lives. According to the authors, individuals typically experience different income levels at various stages of life—higher during their working years and lower during retirement. To maintain a stable standard of living, people save during their earning years and draw on those savings during retirement. Thus, the saving rate over a person's life cycle resembles a bell curve (Modigliani & Brumberg, 1954). Modigliani argues that high growth rates increase the total income of workers compared to retirees and dependents, thereby enhancing overall saving rates. This argument is also strongly supported by Attanasio et al.

Another theory that explains saving behavior is the Buffer Stock Saving Theory, which emphasizes the importance of savings as a mechanism for managing risk and ensuring stable consumption over time, rather than just as a means for investment or future consumption. Carroll et al. (1992) with Buffer Stock Saving Theory posits that individuals hold assets to protect their consumption against unpredictable income fluctuations. The theory assumes that consumers become impatient and cautious when faced with uncertain but significant income sources. To avoid the risks of future income volatility and to ensure their consumption levels, consumers are compelled to set aside reserves by minimizing current consumption to save for unforeseen events. This leads to a cyclical saving rate, meaning individuals tend to save more when their income is higher to support consumption during downturns.

Together, these theories provide a comprehensive understanding of consumer behavior regarding savings and spending across different contexts and time frames. They highlight the complexities of financial

decision-making, revealing how individuals adapt their strategies based on their income patterns, life stages, and external uncertainties. By integrating these perspectives, we can better understand the motivations behind savings and consumption choices, as well as the implications for economic policy and financial planning, particularly in promoting financial stability and resilience among consumers.

## 4. Literature review and hypothesis development

Studies of the determinants of bank deposits have pinpointed various factors, particularly bank-specific and macroeconomic determinants.

### 4.1. Economic growth

Economic growth has also been frequently discussed in studies of bank deposits. However, studies examining the impact of economic growth on deposits have presented conflicting results. Lomuto (2008), Finger and Hesse (2009) and Boadi et al. (2015) demonstrate that economic growth has a positive relationship with the non-term deposit ratio. In these studies, economic growth was measured by the growth rates of Gross Domestic Product (GDP) or Gross National Product (GNP). When GDP increases, it reflects an increase in societal income. These incomes are stored in the form of financial assets, including bank deposits. An increase in GDP may lead to increased consumer demand, which can then lead to an increase in payment transactions. Thus, the production cycle escalates. Companies hold more money in their current deposit accounts to meet payment and production demands. Conversely, during economic downturns, the economy's demand decreases, businesses reduce their scale, and individuals reduce their spending. Consequently, liquidity demand decreases, and CASA ratio tends to be lower. However, the research findings of Hassan (2015) shows that GDP growth has an inverse impact on the growth of financial institutions in Nigeria. The studies by Erna and Ekki (2004) in Indonesia and Haron et al. (2006) in Malaysia demonstrate that GDP does not affect CASA ratio. In this research, we expect economic growth to increase CASA ratio of JSCBs in Vietnam. Therefore, we formulated the second hypothesis:

**H1:** *There is a positive relationship between economic growth and the CASA ratio.*

### 4.2. Inflation

Inflation is a complex environmental factor that impacts both the economy and the banking system. In the broader economy, rising inflation can erode purchasing power, leading consumers to spend less and save more, which may dampen economic growth (Sarkar & Rakshit, 2023a). Businesses face increased costs for inputs, squeezing profit margins and leading to higher prices for consumers. Additionally, uncertainty about future inflation can deter investment, as firms may hesitate to commit to long-term projects amid fluctuating costs. For the banking system, inflation affects interest rates and lending practices. Central banks often respond to rising inflation by increasing interest rates to curb spending and stabilize prices (Sarkar & Rakshit, 2023b). Higher interest rates can lead to reduced borrowing by consumers and businesses, impacting banks' loan portfolios and profitability. Furthermore, if inflation outpaces interest rates on deposits, real returns diminish, organizations and individuals may redirect funds toward speculative assets, such as real estate, gold, or foreign currency, which can affect banks' liquidity (Mohammad & Mahdi, 2010). This finding aligns with the conclusions drawn by other studies (Abduh et al., 2011; Pitoňáková, 2016; Ünvan & Yakubu, 2020). However, there were some exceptions. For instance, a study by Haron et al. (2006) examining banks in Malaysia from 1990 to 2003, found an inverse relationship between inflation and CASA ratio. The authors argued that in Malaysia, the population's asset accumulation regime is robust, allowing individuals to maintain their living standards by keeping more money in CASA even during a high inflation period. Nonetheless, Adem (2015) suggested that the inflation index has no significant impact on CASA growth. To clarify the relationship between inflation and the CASA ratio of JSCBs in Vietnam, we propose the first hypothesis:

**H2:** *There is a positive relationship between inflation and the CASA ratio.*



### 4.3. Real interest rate

The real interest rate, which is the nominal interest rate adjusted for inflation, significantly impacts the activities of the banking system, including lending practices, deposit behavior and the financial stability of the economy. High real interest rates increase borrowing costs for consumers and businesses, often leading to reduced loan demand, which can shrink banks' loan portfolios and affect profitability (Mishkin, 2015). Additionally, higher real rates may prompt banks to tighten lending standards due to increased risks of default, thereby impacting overall credit availability in the economy (Angeloni & Faia, 2013). Furthermore, real interest rates influence banks' investment strategies; higher rates may encourage investment in higher-yielding assets, while low or negative rates could drive banks toward riskier investments (Borio & Zhu, 2012). The impact of real interest rates on deposit growth of commercial banks is also controversial. According to Hassan (2016), high real interest rates increase the attractiveness of savings accounts and time deposits, which can lead to capital inflows into banks, improving their liquidity. This conclusion has been supported by several other studies (Eriemo, 2014; Hazon et al., 2006; Mohammad & Mahdi, 2010; Tuyishime et al., 2015). However, the survey by Garo (2015) conducted in Ethiopia yielded contradictory results. The author argues that there is an inverse relationship between the real interest rate and deposit growth in Ethiopian banks. Similar conclusions were corroborated by Siyanbola et al. (2012), Gemedu (2012) and Mushtaq and Siddiqui (2017). This contradiction highlights the complexity of economic phenomena and the importance of considering regional and contextual factors. Further research and analysis may be necessary to reconcile these conflicting findings and to gain a more comprehensive understanding of the dynamics at play. Therefore, we propose the third hypothesis:

**H3:** *There is a positive relationship between the real interest rate and CASA ratio.*

### 4.4. Profitability

Profitability is an important metric for assessing a bank's financial performance and efficiency (Neal, 2004). Profitability can be measured using various indicators, the most popular of which is Return on Assets (ROA). ROA is a financial ratio that measures a bank's profitability by evaluating how efficiently it utilizes its assets to generate earnings. A higher ROA suggests that a bank is more efficient in using assets to generate profit, whereas a lower ROA may indicate less efficient asset utilization. (Athanasoglou et al., 2006; Ayadi & Pujals, 2005). When a bank achieves high ROA, it is perceived as operating well and investing in assets effectively. This can help banks to attract deposits more easily. Other studies (Banke & Yitayaw, 2022; Daryanto et al., 2020; Erna & Ekki, 2004; Finger & Hesse, 2009; Thao, 2021; Ünvan & Yakubu, 2020) have reached similar conclusions, indicating a positive relationship between ROA and deposits. Banks with higher ROA demonstrate greater customer confidence, making them more likely to be deposited in banks, reflecting a higher level of perceived safety. Considering that banks in good financial conditions are more likely to attract CASA than others with lower profitability, the following hypothesis is proposed:

**H4:** *There is a positive relationship between profitability and CASA ratio*

### 4.5. Bank size

In research on the growth rate of bank deposits, bank size is often measured by total assets or number of branches. However, the conclusions drawn from these studies regarding the relationship between bank size and deposit growth are inconsistent. The majority of studies have indicated a positive relationship. Specifically, banks with large-scale and extensive branch networks tend to attract larger deposit volumes compared to smaller ones (Fueda & Konishi, 2007; Thao, 2021). In contrast, Kaufman (1972) and Finger and Hesse (2009) argued that smaller banks, while generating fewer deposits in absolute terms, have higher growth rates (in relative terms) than larger ones. However, we expected bank size and CASA ratio of JSCBs in Vietnam to have a positive relationship:

**H5:** *There is a positive relationship between bank size and CASA ratio.*

#### 4.6. Bank liquidity

Bank liquidity refers to its ability to meet its short-term obligations and financial commitments as they come due without incurring significant losses or disruptions to its operations. Simply put, it is about having enough cash or easily accessible assets to cover withdrawals, loan disbursements, and other financial obligations. One common liquidity ratio is the liquidity coverage ratio (LCR), which compares a bank's high-quality liquid assets (HQLA) to its total net cash outflow over a specified time horizon. Another liquidity ratio is the net stable funding ratio (NSFR), which compares a bank's available stable funding (ASF) with its required stable funding (RSF) over a longer time horizon. These ratios provide insights into a bank's ability to meet its short- and long-term financial obligations. The higher the ratio, the better the bank's liquidity position. According to Finger and Hesse (2009), liquidity plays a crucial role in bank deposit growth. The reason cited is that organizations and individuals are more willing to deposit money into a bank if they are confident and can withdraw it whenever they want. Conversely, when faced with unexpected withdrawal restrictions, customers are more likely to feel "injured" and refrain from depositing money in banks (Mora, 2010). In this study, we assume that banks with higher liquidity attract more deposits. Hence, the sixth hypothesis is proposed:

**H6:** *There is a positive relationship between bank liquidity and the CASA ratio*

#### 4.7. Non-performing loan ratio

Non-performing loan (NPL) ratio is a financial metric used to assess the quality of a bank's loan portfolio. It measures the proportion of a bank's loans that do not generate income because borrowers have failed to make scheduled payments for a specified period, typically 90 days or more. A higher NPL ratio indicates a higher level of risk in the bank's loan portfolio, as it suggests that a larger portion of loans may default or become unrecoverable. Conversely, a lower NPL ratio indicates a healthier loan portfolio, with fewer non-performing loans. Banks closely monitor their NPL ratio as part of their risk management practices, and regulators often use this ratio as an indicator of a bank's financial health and stability (Baral, 2007). In general, studies have consistently shown an inverse relationship between the non-performing loan (NPL) ratio and deposit growth in banks. Banks with high NPL ratios often face difficulties in deposit growth, because depositors perceive them as less secure. Conversely, depositors are more reassured when depositing funds into banks with lower NPL ratios (Finger & Hesse, 2009; Fueda & Konishi, 2007; Loan et al., 2023; Thao, 2021). To examine the relationship between the NPL ratio of listed commercial banks in Vietnam, the following hypothesis is proposed:

**H7:** *There is a negative relationship between the NPL ratio and the CASA ratio*

The theoretical framework was developed as shown in Figure 1.

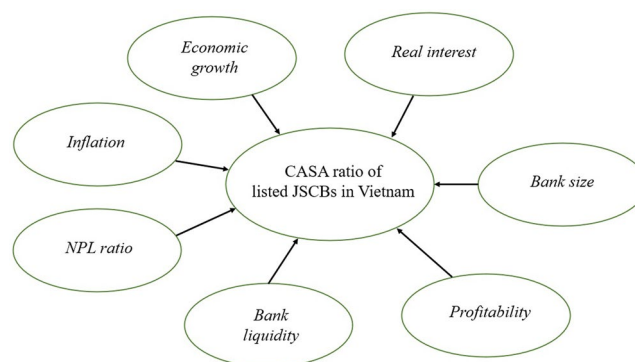
### 5. Research methodology

#### 5.1. Sample description and data

Currently, there are 49 banks in Vietnam, comprising 4 banks that are 100% state-owned, 31 JSCBs, 9 banks with 100% foreign capital, 2 Policy Banks, 1 Cooperative Bank, and 2 Joint Venture Banks. According to information published on the website of the State Securities Commission ([www.ssc.gov.vn](http://www.ssc.gov.vn)), at the time of data collection (December 31, 2023), 27 JSCBs were listed on the Hanoi Stock Exchange (HNX) and the Ho Chi Minh Stock Exchange (HOSE), with a total market capitalization exceeding 70 billion USD, accounting for over 25% of the total capitalization of the Vietnamese stock market. Our samples are 27 listed JSCBs from 2018 to 2023, with 162 bank-year observations. The samples are reported in Table 1:

- Data on macroeconomic determinants (economic growth, inflation, and real interest rates) were collected from statistical reports published on the Websites of the General Statistics Office of Vietnam (<https://www.gso.gov.vn/>) and the State Bank of Vietnam (<https://www.sbv.gov.vn/>).





**Figure 1.** Theoretical framework of the study.

**Table 1.** Classification of listed banks by total assets.

No	Total assets	Number of banks
Group 1	Greater than 1 million billion VND	3
Group 2	From 200 trillion VND to less than 1 million billion VND	13
Group 3	Under 200 trillion VND	11
Total		27

- Data on CASA ratios and bank-specific were obtained from financial data published on the Simplize stock valuation Website (<https://simplize.vn/>) and Financial Statements or Annual Reports published on the Websites of JSCBs listed in Vietnam from 2018 to 2023. These sources are considered official channels of information, demonstrating legal validity and high reliability, as the Financial Statements of listed banks undergo auditing by independent firms and approval by the State Securities Commission of Vietnam. The use of secondary data in this study adheres to all relevant permissions and rights.

## 5.2. Dependent and independent variables

To examine the impacts of bank-specific and macroeconomic determinants on the CASA ratio of JSCBs listed in Vietnam, the model for this study is specified as follows:

$$CASA_{i,t} = \beta_0 + \beta_1 GROW_{i,t} + \beta_2 INFL_{i,t} + \beta_3 RIR_{i,t} + \beta_4 ROA_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 LIQ_{i,t} + \beta_7 NPL_{i,t} + U_{i,t} \quad (1)$$

Where: CASA: CASA ratio, GROW: Economic growth, INFL: Inflation, RIR: Real interest rate, ROA: Profitability, SIZE: Bank size, LIQ: Liquidity, NPL: Non-performing loan ratio,  $i, t$  represents bank  $i$  in year  $t$ .

Table 2 presents the measurement methods for the variables and data sources.

## 5.3. Methodology

This study employs quantitative methods to analyze the factors influencing the CASA ratio of JSCBs listed on the Vietnamese stock exchange. The Stata 17 software was utilized for model estimation. Initially, a regression analysis using the Pooled OLS model (OLS) was conducted. However, the OLS results alone were deemed insufficient to ascertain the statistical significance and precise impact of factors on the CASA ratio of JSCBs, primarily due to its inability to account for the spatiotemporal cross-effects. Subsequently, both fixed effects model (FEM) and random effects model (REM) were used. These models were chosen to address this limitation, thereby enhancing the model's appropriateness and facilitating the examination of spatiotemporal variables' cross-effects in analyzing the factors influencing the CASA ratio for JSCBs. To determine the most suitable model, a Hausman test was performed between the FEM and REM models to select the optimal approach. Additionally, the Generalized Method of Moments (GMM) method has been used to address the issues encountered by the model due to the nature of the panel data structure employed in this study.

## 6. Results and discussion

### 6.1. Descriptive statistics

Table 3 presents the descriptive statistics of the variables used in the research model:

The average CASA ratio of surveyed banks over the study period reached 16.83%, with the lowest being 14.18% (2019) and the highest being (18.16%) in 2021. The years 2022 and 2023 witnessed a decreasing trend in the CASA ratio, comprising 15.43% and 15.74%, respectively. The high standard deviation of the CASA ratio of 1.0733 indicates a large gap in the CASA ratio of the surveyed banks. Groups 1 and 2 (JSCBs with total assets over 200 trillion VND) have a higher and more stable CASA ratio compared to smaller ones. Some banks in Groups 1 and 2 have CASA ratios above 40%, while the number of banks in Group 3 is below 10%. For example, Techcombank established a record of 50.5%, which is 17 times higher than BAC A Bank (3.24%) and 11 times higher than VietABank (4.8%). Noticeably, many banks have witnessed a significant drop in CASA ratio in the past years. For instance, this figure for TP Bank decreased from 23.3% in 2021 to 22.2% in 2022; VPBank declined from 22.4% in 2021 to 9.7% in 2022; KienlongBank dropped sharply from 15.5% to 6.4%. Similarly, the natural logarithm of total assets (SIZE) fluctuates from 23.4101 to 35.2934 and has an average value of 25.6443, with a high standard deviation of 1.1427, indicating a significant difference in size among JSCBs listed in Vietnam. The average CASA ratio of surveyed banks between 2018 - 2023 is depicted in Figure 2.

### 6.2. Correlation analysis

Next, we conducted a Pearson Correlation test to examine the correlation between the dependent variable (CASA ratio) and the independent variables in the research model.

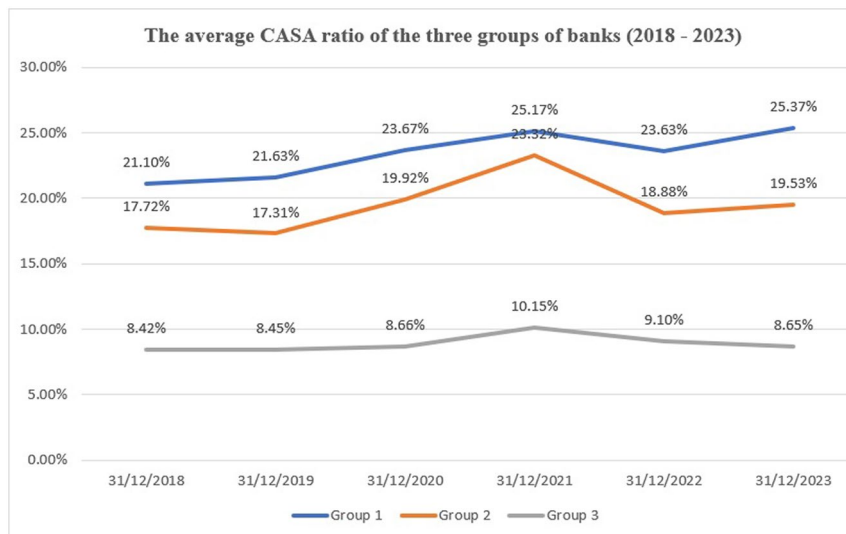
Table 4 illustrates that all correlation coefficients are less than 0.8, so the multicollinearity phenomenon of the variables is eliminated (Gujarati & Porter, 2009). Therefore, all variables were retained for regression analysis and re-examined using the Variance Inflation Factor (VIF) for a more reliable analysis. According to Gujarati and Porter (2009), any variable with a VIF above five is assumed to indicate a potential multicollinearity problem. The test results showed that the VIF values ranged from approximately 1.03 to 4.28, suggesting that there were no multicollinearity problems among the explanatory variables (Gujarati & Porter, 2009).

**Table 2.** Description of variables.

Research variables	Code	Measure	Sources of data
CASA ratio	CASA	$\frac{\text{TotalCASA}}{\text{TotalDeposit}} * 100\%$	Banks Financial Statements, Annual Reports
Economic growth	GROW	GDP growth	Vietnam General Statistics Office
Inflation	INFL	Consumer Price Index (CPI)	Vietnam General Statistics Office
Real interest rate	RIR	Nominal Interest Rate – Inflation Rate	Vietnam Banking Report
Profitability	ROA	Return/Total assets	Banks Financial Statements, Annual Reports
Bank size	SIZE	The natural logarithm of total assets	Banks Financial Statements, Annual Reports
Liquidity	LIQ	$\frac{\text{HighQualityLiquid Assets (HQLA)}}{\text{TotalNet Cash Outflows}}$	Banks Financial Statements, Annual Reports
Non-performing loan ratio	NPL	$\frac{\text{Overdue debts (group 3,4,5)}}{\text{Total debts balance}}$	Banks Financial Statements, Annual Reports

**Table 3.** Descriptive statistics of research variables.

Variables	Min	Max	Mean	Standard deviation
CASA ratio (CASA)	0.0324	0.505	0.1683	1.0733
Economic growth (GROW)	0.0255	0.0822	0.0611	0.0165
Inflation (INFL)	(0.0097)	0.0643	0.0293	0.0121
Real interest rate (RIR)	0.0476	0.093	0.0753	0.0279
Profitability (ROA)	(0.0599)	0.0596	0.0115	0.0085
Bank size (SIZE)	23.4101	35.2934	25.6443	1.1427
Liquidity (LIQ)	0.0101	0.1902	0.0411	0.0271
Non-performing loan ratio (NPL)	0.0113	0.0288	0.01089	0.0058



**Figure 2.** The average CASA ratio of the three groups of banks (2018–2023).  
Source: Authors' compilation.

**Table 4.** Correlation coefficients among variables.

	CASA	GROW	INFL	RIR	ROA	SIZE	LIQ	NPL
CASA	1	−0.0578	−0.0306	−0.0824	0.3487	0.3498	0.0293	−0.1405
GROW		1	−0.0083	−0.0077	−0.0944	−0.0198	−0.0574	0.0321
INFL			1	0.6631	0.1041	−0.3781	0.2400	0.0277
RIR				1	0.0680	−0.3645	0.1899	0.0703
ROA					1	0.1299	0.0668	−0.1830
SIZE						1	−0.0517	−0.1071
LIQ							1	0.0330
NPL								1

### 6.3. Regression analysis and testing of research hypotheses

Table 5 examines the relationship between bank-specific and macroeconomic determinants and CASA ratio using traditional panel models (the OLS, FEM and REM). The adjusted R-squared value in both models was greater than 0.4, which is a fairly high rate in social research. Subsequently, the Hausman test was used to select between FEM and REM models. If the P-value (Hausman) was > 0.05, the selected model was REM. Conversely, the FEM model is chosen if the P-value (Hausman) < 0.05 (Gujarati & Porter, 2009). The results of the Hausman test yielded a Pro Chi-Square value of 0.245 > 0.05, suggesting that REM is preferred.

However, these results also indicate that the model is endogenous. To ensure the reliability and accuracy of the estimates, this study employs the GMM model to analyze the factors affecting the CASA ratio of JSCBs listed in Vietnam. The GMM was chosen due to its ability to handle common econometric issues such as endogeneity, serial correlation of errors, and heteroscedasticity problems that frequently arise in time series or panel data models. The GMM model in this study is specified as follows:

$$\text{CASA}_{i,t} = \beta_0 + \beta_1 \text{CASA}_{i,t-1} + \beta_2 \text{GROW}_{i,t} + \beta_3 \text{INFL}_{i,t} + \beta_4 \text{RIR}_{i,t} + \beta_5 \text{ROA}_{i,t} + \beta_6 \text{SIZE}_{i,t} + \beta_7 \text{LIQ}_{i,t} + \beta_8 \text{NPL}_{i,t} + U_{i,t} \quad (2)$$

Additionally, the authors have used the Hansen Test and the Arellano-Bond Test to check the necessity of the instrumental variables and the correlation issues in the model. The results show that the *p*-value of the J-statistic (Hansen Test) is 0.35, which is greater than the significance level of 10%. The Arellano-Bond test gives a *p*-value of 0.95, which is also above the 10% significance level. Therefore, GMM is appropriate, as the instrumental variables are necessary and there is no serial correlation. The GMM estimation results can be used for further analysis.

The regression results according to GMM show that the variables with a statistical significance level of 1% include inflation (INFL), bank size (SIZE), liquidity (LIQ), and profitability (ROA). The economic

**Table 5.** Results of pooled OLS, FEM and REM regression analysis.

	Pooled OLS	FEM	REM
GROW	−0.262462 (0.331066)	−0.411334 (0.246142)	−0.377806** (0.149506)
INFL	0.433870** (0.184790)	0.121783 (0.148096)	− 0.245488*** (0.076419)
RIR	−0.732525 (0.382882)	−0.935088*** (0.289095)	0.082394 (0.203226)
ROA	2.950531*** (0.656049)	1.361867** (0.561674)	2.553537*** (0.697096)
SIZE	0.026806*** (0.005103)	0.023926*** (0.008876)	0.028783*** (0.010967)
LIQ	−0.081611 (0.196516)	−0.260718 (0.163938)	− 0.253809*** (0.072843)
NPL	−0.210984 (0.361858)	−0.260718 (0.301501)	0.075757 (0.072843)
R-squared	0.420479	0.5551	0.5248
Breusch–Pagantest $\lambda_2$ [Prob.> $\lambda_2$ ]	0.661606		
Hausmantest $\chi^2$ [Prob.> $\chi^2$ ]			0.245
F-statistic	11.6861	14.80962	
Prob (F-statistic)	0.0000	0.0000	0.0000
No. banks	27	27	27
No. Observations	162	162	162

Notes: *t* statistics in brackets; \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

growth variable (GROW) is statistically significant at the 5% significance level, and the CASA variable has a significance level of 10%. The non-performing loan ratio (NPL) and real interest rate (RIR) variables do not affect the CASA ratio of the surveyed commercial banks.

The lagged value of the dependent variable CASA has a positive effect on the current CASA, indicating that banks with a higher CASA ratio in the previous year tend to have a higher CASA ratio in the current year.

The coefficients of inflation (INF) and economic growth (GROW) are negative, suggesting that an increase in inflation and economic growth reduces the CASA ratio of JSCBs listed in Vietnam. Although the results of the regression analysis are not as our expectations, it is consistent with previous findings in similar markets to Vietnam, such as the study of Haron et al. (2006) in Malaysia and Hassan (2015) in Nigeria, which found no significant association between inflation and economic growth to CASA ratio. This can be explained as follows:

During periods of rapid consumer price index (CPI) growth, the State Bank of Vietnam often employs liquidity-absorbing policies through open market operations or increases in policy interest rates. This prompts commercial banks to raise their deposit interest rates to attract term savings deposits. Consequently, individuals prefer to deposit funds in long-term savings rather than hold them in the CASA. Conversely, during controlled inflationary periods, the State Bank of Vietnam implemented policies to reduce interest rates. Depositors are less inclined to opt for long-term deposits and instead focus on alternative investments, such as gold, real estate, or stocks, to achieve better returns. As a result, funds are not tied up in long-term deposits but rather circulate within the system across various investment channels through the CASA.

Similarly, the CASA ratio tends to decrease as GDP increases; conversely, it increases when GDP decreases. This phenomenon can be attributed to government intervention during economic downturns. For instance, during the 2020–2021 period marked by the Covid-19 pandemic, despite a decline in GDP growth, CASA saw a notable increase from 16.09% to 18.16% over the two years. This was due to the State Bank of Vietnam injecting liquidity into the market, reducing deposits and lending interest rates. Consequently, individuals favoring keeping funds in the payment account for easier investment conversion. Additionally, Vietnamese individuals tend to opt to save deposits over current accounts when income rises.

Both Bank size (SIZE) and profitability (ROA) have positive and significant (at the 1% level) impacts on the CASA ratio. This result is as expected by the authors and also in line with the findings of previous studies (Erna & Ekki, 2004; Fueda & Konishi, 2007; Thao, 2021; Ünvan & Yakubu, 2020). This indicates that JSCBs with large assets and high profitability have many resources to invest in utility services, facilities, and modern payment services to meet customer demands. Therefore, they are more competitive than

the others in attracting new customers. Moreover, banks with large-scale and good business results will make depositors feel more secure and confident when depositing money. Hence, they have more advantages in mobilizing demand deposits.

Bank liquidity (LIQ) hurts the CASA ratio. This implies that banks with high liquidity may be less inclined to make efforts to mobilize CASA. From our perspective, this result is consistent with the context and characteristics of JSCBs in Vietnam. In fact, banks with high liquidity may be less inclined to make efforts to mobilize deposits by increasing interest rates to compensate for liquidity in the short term to ensure a liquidity index according to the regulations of the State Bank.

According to the results in Table 6, we did not find a statistically significant influence of the non-performing loan ratio (NPL) and real interest rate (RIR) on the CASA ratio of JSCBs listed in Vietnam at all three levels of significance: 10%, 5%, and 1%. Thus, Hypotheses H3 and H7 are rejected. The results of our study contrast with those of Fueda and Konishi (2007) and Hazon et al., 2006, which can be explained based on the research context in Vietnam as follows:

Banks exhibiting elevated levels of NPL have deficiencies in managerial aptitude. Prospective depositors hesitate toward entrust funds with such institutions, apprehensive of the heightened risk of default or insolvency. Moreover, these banks encounter challenges in maintaining competitive service standards compared to their counterparts with lower NPL ratios. Nonetheless, within the Vietnamese context, regulatory interventions by the State Bank serve to stabilize financial markets and safeguard depositor interests in scenarios of potential default or bankruptcy. Consequently, depositors' apprehensions regarding deposit losses are mitigated. Notably, the CASA ratio remains unaffected by real interest rates, as interest rate adjustments typically pertain to fixed-term deposits. Empirical observations throughout the study period indicate uniformity in the interest rates for non-term deposits across banks, typically ranging between 0.1% and 0.5% annually. Individuals primarily utilize payment accounts for non-cash transactions. Hence, fluctuations in interest rates exert minimal influence on deposit behavior.

The results of the research hypothesis on the impact of the factors on the CASA ratio of JSCBs listed in Vietnam are shown in Table 7.

**Table 6.** Results of GMM regression analysis.

	GMM
CASA <sub>t-1</sub>	0.077335 (0.04315)
GROW	−0.359726** (0.13205)
INFL	−0.189538*** (0.17519)
RIR	0.092562 (0.12056)
ROA	3.583537*** (0.56263)
SIZE	0.039983*** (0.04182)
LIQ	−0.245029*** (0.120843)
NPL	0.086428 (0.244354)
No. banks	27
No. Observations	162
Hansen test ( <i>p</i> -value)	0.35
Arellano-Bond ( <i>p</i> -value)	0.95

Notes: *t* statistics in brackets; \**p* < 0.1, \*\**p* < 0.05, \*\*\**p* < 0.01.

**Table 7.** Summary of results of research hypotheses.

Hypotheses	Authors' expectations	Results	Significance level
H1: There will be a positive relationship between economic growth and CASA ratio.	+	−	5%
H2: There will be a positive relationship between inflation and CASA ratio.	+	−	1%
H3: There will be a positive relationship between real interest rate and CASA ratio.	+	−	Not statistically significant
H4: There will be a positive relationship between profitability and CASA ratio.	+	+	
H5: There will be a positive relationship between bank size and CASA ratio.	+	+	
H6: There will be a positive relationship between bank liquidity and CASA ratio.	+	−	1%
H7: There will be a negative relationship between NPL ratio and CASA ratio.	−	−	Not statistically significant

## 7. Conclusions

Deposits, particularly CASA of JSCB listed in Vietnam, are influenced by a combination of bank-specific and macroeconomic factors. Analysis using the GMM reveals that "bank size" and "profitability" play pivotal roles in determining CASA growth among the surveyed banks. Additionally, the study identifies a negative and statistically significant correlation between three factors: "inflation," "economic growth," "liquidity" and CASA ratio. Conversely, "real interest rates" and "liquidity" have no discernible impact on the CASA ratio. This research underscores the necessity for policies aimed at augmenting CASA ratio and stabilizing mobilized capital among JSCBs to prioritize enhancements in profitability and scale. Moreover, the findings underscore the significant influence of macroeconomic conditions on the CASA ratio of Vietnamese JSCBs. Therefore, policymakers and regulatory authorities must implement stringent measures to regulate the economy, ensure a stable macroeconomic environment, and avoid abrupt policy shifts.

## Authors' contributions

Conceptualization: Q.T.N. and T.H.M.T.; methodology, Q.T.N.; validation, Q.T.N. and L.D.N.; formal analysis, Q.T.N. and T.H.M.T.; resources, Q.T.N. and L.D.N.; writing—original draft preparation, Q.T.N., T.H.M.T. and L.D.N. All authors have read and agreed to the published version of the manuscript.

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## Data availability statement

The data that support the findings of this study are available from secondary data, collected from Statistical reports published on the Websites of the General Statistics Office of Vietnam (<https://www.gso.gov.vn/>) and the State Bank of Vietnam (<https://www.sbv.gov.vn/>), and Financial Statements or Annual Reports published on the Websites of Joint stock commercial banks listed in Vietnam. These sources are considered official channels of information, demonstrating legal validity and high reliability, as the Financial Statements of listed banks undergo auditing by independent



firms and approval by the State Securities Commission of Vietnam. The use of secondary data in this study adheres to all relevant permissions and rights.

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## Appendix A

**Table A1.** CASA ratio of listed joint stock commercial banks in Vietnam from 2018 to 2023

Bank	CASA%					
	31/12/2018	31/12/2019	31/12/2020	31/12/2021	31/12/2022	31/12/2023
<b>Group 1</b>						
BIDV	17.1%	17.1%	18.6%	19.7%	18.00%	19.80%
Vietcombank	30.3%	30.8%	32.8%	35.7%	33.10%	33.90%
VietinBank	15.9%	17.0%	19.6%	20.1%	19.80%	22.40%
Average of Group 1	21.10%	21.63%	23.67%	25.17%	23.63%	25.37%
<b>Group 2</b>						
MB	40.6%	38.4%	40.9%	48.7%	37.60%	39.60%
Techcombank	28.7%	34.5%	46.1%	50.5%	40.00%	39.9%
SHB	8.9%	7.7%	9.7%	9.5%	10.60%	10.10%
HDBank	9.0%	12.6%	12.4%	13.6%	7.60%	11.10%
LPBank	18.4%	14.5%	14.6%	10%	9.30%	9.70%
MSB	21.7%	20.7%	29.0%	35.8%	31.00%	26.30%
OCB	13.4%	12.2%	12.0%	15.8%	13.70%	12.20%
SeABank	10.2%	12.5%	13.2%	8.9%	12.40%	11.30%
ACB	17.5%	19.1%	21.6%	25.5%	18.40%	21.90%
VPBank	13.7%	13.3%	15.6%	22.4%	9.70%	17.40%
Sacombank	14.6%	11.5%	12.2%	22.8%	19.00%	18.40%
VIB	14.6%	11.5%	12.2%	16.3%	14.00%	13.30%
TPBank	19.1%	16.5%	19.4%	23.3%	22.20%	22.70%
Average of Group 2	17.72%	17.31%	19.92%	23.32%	18.88%	19.53%
<b>Group 3</b>						
NamABank	8.3%	8.2%	9.1%	9.4%	8.80%	7.10%
PGBank	12.4%	13.1%	12.7%	15.4%	17.70%	17.20%
ABBank	12.5%	13.6%	15.1%	17.1%	10.90%	11.60%
VietABank	4.4%	4.8%	6.2%	6.8%	4.00%	5.00%
EximBank	15.2%	13.7%	15.2%	15.8%	17.90%	16.10%
SaigonBank	11%	9.3%	12%	10.6%	9.30%	7.30%
BVBank	5.2%	6.1%	5.5%	6.5%	7.30%	5.80%
Bắc Á Bank	5%	3.5%	5.1%	3.3%	4.10%	4.40%
NCB	5.3%	6.3%	5.6%	6.4%	6.80%	6.30%
VietBank	6.7%	7.2%	5.6%	4.8%	6.90%	8.30%
KienlongBank	6.6%	7.1%	3.2%	15.5%	6.40%	6.00%
Average of Group 3	8.42%	8.45%	8.66%	10.15%	9.10%	8.65%
Average Total	14.31%	14.18%	16.09%	18.16%	15.43%	15.74%

Source: Annual Reports published on the Websites of JSCBs listed in Vietnam from 2018 to 2023.